LOGIC PD™

Accelerate growth.™

Transforming the diagnosis of Bovine Respiratory Disease and shaping Geissler Corporation's future.

"I have not found another firm that can finish a project completely from design to engineering and manufacturing with project managers who live and breathe our projects and truly work hard to understand our needs. I have worked with Logic PD for almost 15 years and the disciplines and talent I am looking for is always there. I have complete trust in their combined skills."

> *- Randy Geissler, CEO Geissler Corporation*

Across the United States, a silent disease is having a devastating impact on the cattle industry. Hidden behind common symptoms such as rapid breathing, running noses, and animal depression, Bovine Respiratory Disease (BRD) is difficult to diagnose and costly to treat. For cattle producers the financial impact extends well beyond the estimated $2 billion annually spent to diagnose and treat the disease to include lost milk production and animal loss from untreated cases.

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Veterinarians and animal owners are faced with challenges of accurate and timely diagnosis of infected cattle and proactively implementing strategies to control and minimize BRD. Early detection is critical in treating BRD and the most accurate way to diagnose the disease is having veterinarians to listen to the lungs of each animal, a process called auscultation.

A time consuming and expensive process, auscultation is often imprecise and requires veterinarians to be acutely aware of the breathing nuances associated with the various stages of the disease. Treatment results are sometimes unpredictable; forcing ranchers to check their herds on a regular basis.

Inspiration for a new product becomes a new service.

Geissler Corporation, a veterinary technology company, believed that cattle producers could reduce death loss and the cost of treatment by bringing efficiency and consistency to the diagnosis process through the application of digital technology to the heuristic approach of auscultation. With a new diagnosis concept outlined and data in hand, Geissler approached Logic PD in 2012 for guidance and assistance in developing an accurate and accelerated way for veterinarians to diagnose BRD. Their initial solution was to develop an innovative and noninvasive tool with a specific algorithm to automatically diagnose cattle based on their lung sounds.

"At first our approach was to use technology to develop a way to quantify BRD when we auscultate so that we could go beyond the black and white of the diagnosis and identify the disease early," said Randy Geissler, CEO, Geissler Corporation. "Not only did we need to diagnose the disease during early onset, the solution needed to be safe for the animals, easy to apply and low cost to manufacture."

To convert their idea into a solution, Geissler enlisted Logic PD to aid in development with design, engineering and manufacturing services for a BRD diagnostic device. The result was the Whisper® Veterinary Stethoscope that combines connected and cloud-based technologies with Geissler's database of lung sounds to create a diagnostic instrument that can identify early onset as well as the stage of advancement of the disease.

In the three years since its introduction, the stethoscope has shown dramatic reduction in BRD in feed yards reducing cattle loss by as much as 38 percent through the early diagnosis and treatment of the disease. While the immediate impact of the stethoscope was anticipated by the Whisper team and early adopters, the transformative value of the data being collected by the stethoscope was initially overlooked.

Early in the development Logic PD introduced Geissler to the notion of connecting everything back to the cloud so that they could capture the data including treatment outcomes; expanding what data could mean to Geissler Corp. and its partners in animal health. Beyond tracking the individual health of an animal, the data had untapped potential for improving stockyard productivity and animal wellness as well as identifying opportunities for Geissler to enhance or add services to support their customers.

"The data the Whisper system captured empowered Geissler to move from a product-based company to an outcomes-based service provider," said Bruce DeWitt, CEO at Logic PD. "Instead of simply looking at the immediate results of the device – treating animals to reduce death loss – Geissler was empowered to investigate other implications the data could have on individual owners as well as the production cattle industry as a whole."

According to DeWitt the "deployment of connectivity and proliferation of connectivity – even in the stockyard - makes it possible to connect all things together." Measurements from various points within the operation – from weigh scales to hospital barns and milk productivity - can seamlessly connect together and be integrated into patient records to present a comprehensive picture of an animal's health and strength. "By treating individual animals Geissler Corp. is improving the health of the herd – a true population health solution," says DeWitt.

Realizing the initial value.

The story of the Whisper stethoscope actually begins with data and the domain knowledge of those who understood it. With a library of lung sounds in tow, Geissler engaged Logic PD to bring their new product inspiration to life. Starting with user research, Logic PD designers sought to determine how users can safely use the device with live animals. With an electronic stethoscope as the sensor to capture the data, Logic PD experts set upon working with the database of sounds and diagnostic information to create the algorithm for the diagnosis.

The Logic PD team built a "sick cow" emulator, a hide covered silicone gel model with a speaker inside, to test both the stethoscope acoustic pick up as well as the diagnostic algorithms. Each lung sound had an associated veterinary diagnosis so the team was then able to effectively use the entire Whisper database to tune and test the algorithm.

As part of the solution, Whisper wirelessly connects the stethoscope to a computer so that an animal's score can be tagged to their specific file in the veterinarian's patient database. The chute-side PC also gives the operator immediate feedback and visualization of the measurement and integrates the diagnosis into the hospitals' health record systems. The addition of the cow's "patient health record" is what makes Whisper's big data so valuable.

Designed and manufactured only for animals, cattle producers briefly hold the Whisper® Veterinary Stethoscope over the animal's lung. Once the sound is captured it is analyzed using a propriety algorithm which classifies the lung condition as normal, acute or chronic and then transmits a diagnosis back to the stethoscope. The whole process takes approximately eight seconds per animal. Data captured is additionally forwarded to the cloud for storage in the overall database.
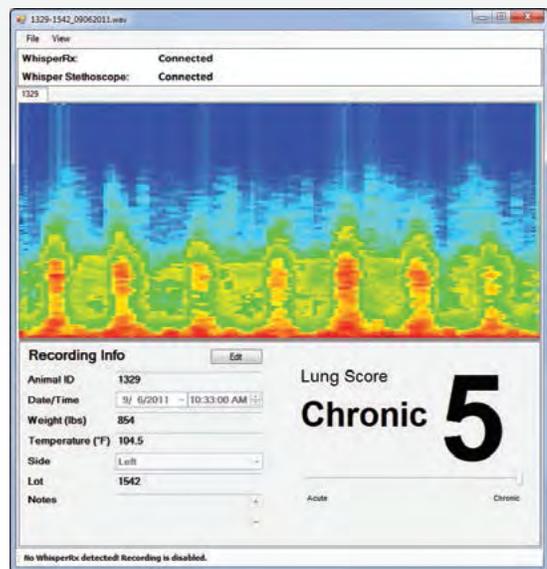
Initially 10 stethoscopes were manufactured at Logic PD and introduced into the market to start creating adoption and to validate that the tool could be used to make a diagnosis. Following product trials of the first-generation Whisper, Geissler returned to Logic PD to improve the algorithm, add calibration, and then incorporate self-diagnostics into to the device to ensure accuracy during use.
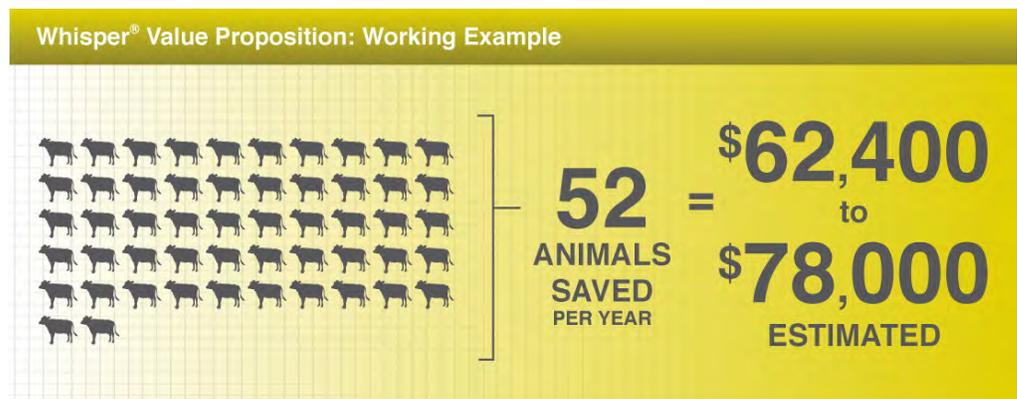
New value found in the data.

Over the course of three years, Logic PD has worked with Geissler to transform the Whisper stethoscope from a diagnostic medical device into a successful connected business. From the beginning, Logic PD counseled Geissler to prepare the product for the next step of value generation and connect the Whisper stethoscope to the cloud in a way that was scalable.

"Our vision was to migrate stockyard operators from looking at the Whisper as simply a loss prevention tool into an outcome based production tool that leverages animal health data and then ultimately as a vehicle for examining and implementing productivity strategies," said DeWitt. "In doing so, Geissler has transformed itself from simply selling a product to selling a service."

As a diagnostic tool, the Whisper stethoscope allowed Geissler to offer customers the ability to better identify BRD. Geissler then built a robust database and integrated treatment protocol information to provide users with additional value and improve animal outcomes even further. Defining treatment protocols allowed Geissler to virtually guarantee effective treatment of infected animals, reducing death loss and improper treatment of the disease while simultaneously reducing the treatment cost per animal through more effective dose applications.

"The idea here is to start treating animals more efficiently," explains DeWitt. "Higher accuracy and consistency of lung sounds leads to reduced death loss and reduced cost of treatment; not only saving more animals but also being more cost efficient in the management of the herd." The result of these improvements demonstrated operational efficiencies in the use of the stethoscopes and an ever growing database of measurements and outcomes.

From there, the Geissler team continued to study and investigate the data. Geissler returned to Logic PD in 2014 and asked them to add a heart rate sensing module into the stethoscope

Whisper® Value Proposition: Working Example

52 ANIMALS SAVED PER YEAR = $62,400 to $78,000 ESTIMATED

algorithm. Geissler had formed a premise that with the addition of heart sounds, the system could now measure the combination of heart rate and lung sounds in a similar manner as a cardiac stress test. With this new metric, users could identify stronger, healthier animals and better predict growth and future wellness. The original intention of Whisper was to treat sick animals, roughly 8% of the herd. Now through the big data generated during the diagnosis of over a hundred thousand animals, Geissler had a new offering to extend the use of Whisper to healthy animals — ten times as many applications.

LOGIC PD™

Moving to scale with Logic PD HyperSaaS™.

When Geissler Corp. first introduced Whisper they partnered with a third-party system integrator to sell and install the Whisper stethoscope system. Stockyards then paid a graduated per-yard per-month fee for unlimited use of the stethoscope. This model proved beneficial for establishing the product with larger operations but made the technology cost prohibitive for smaller operations or those with multiple sites. As a result, Whisper was missing a large part of the BRD and cattle-health market. Geissler returned to Logic PD this time to help construct a new business platform and business model to prepare for a larger scale launch, one that would be inclusive of use on sick and healthy animals in all sized herds.

To facilitate the expansion of services, Logic PD took responsibility for Whisper's complete digital infrastructure. For its initial launch, Geissler created their own SaaS infrastructure and now they were ready to move to a scalable, more functional solution. Logic PD worked with the Whisper team to transfer the management and collection of data from all stethoscopes onto Logic PD's HyperSaaS™ platform.

The HyperSaaS™ platform, a flexible, multi-functional SaaS architecture enabled the team to launch Whisper quickly while simultaneously increasing speed, reliability, and scalability. HyperSaaS™ can leverage existing functional SaaS suppliers or client business systems thereby maximizing the reuse of the Geissler infrastructure as well as the use of Logic PD's network of suppliers.
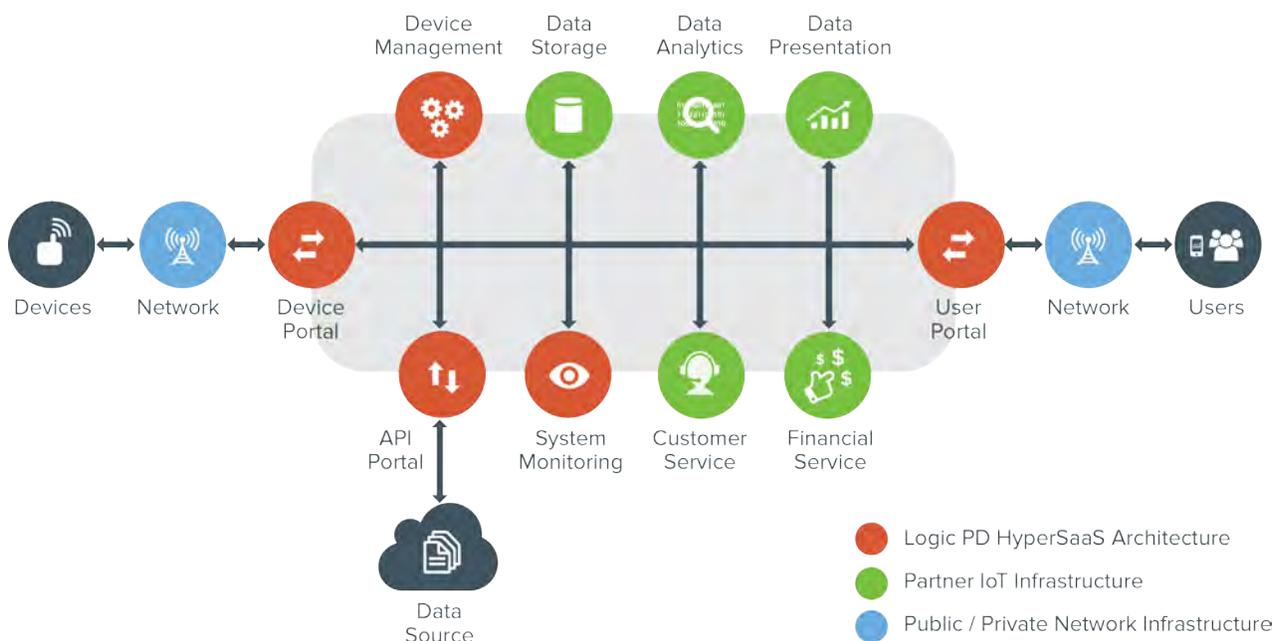
In less than six weeks, the Whisper platform was moved to the HyperSaaS™ platform and the Logic PD team began streamlining the collection of data and provisioning of new stethoscopes. This resulted in an increase in throughput and reduced processing time, In addition, the data collection and presentation was transformed from batch to a real-time stream. Most important, the move to the HyperSaaS™ platform will enable Geissler to deploy a pay-per-use and pay-for-use business models for Whisper's multiple offerings.

Transforming the Whisper business model.

Several different business models were explored to determine which potential models would ensure both data collection and scalable value capture for Geissler in the cattle management market. Geissler had introduced the concept of monthly subscriptions for the initial use of Whisper, but this model was limiting further adoption and not capturing the complete value of the service. In one case, Whisper demonstrated more than a half-a million dollars of savings for the operator for a fixed subscription fee of a few tens of thousands.

To better facilitate product adoption, Geissler and Logic PD created two business models; pay-for-use and pay-as-used. Pay-for-use allows Whisper customers to purchase uses of the system in advance enabling customers to buy a "number of uses" that they can use when and where they like. This model significantly expands the market into which Geissler's channel partner can market and sell because the fixed cost of the service is significantly reduced without impacting Geissler's operational costs. Pay-as-used better allows larger customers to scale their use of the Whisper platform across both sick and healthy animals.

The pay-as-used digital business platform is a true usage based model; customers pay only when they use the service. This multi-model approach reduces cost barriers to adoption and allows veterinarians to scale their costs based on service delivery while helping Geissler better capture the value of all of their offerings.

IoT enables change.

Access to big data has transformed how Geissler looks at its services and its business strategy. With guidance and expertise from Logic PD, Geissler is capturing value from the data and evolving its business from a single purchase to a monthly subscription and now to a usage-based revenue model. What started out as a veterinary device has morphed into a connected business that has reduced cattle death loss, lessened the economic impact of BRD and is enhancing productivity and profitability at the stockyard as well as the business level.

"Today, Geissler is focused on data acquisition and outcomes," said DeWitt. "While they still need to create products that can capture more data or integrate with other data capturing technology, their value proposition is now based on the data analytics to look for other ways to add value based on what they learned from that data."

By the numbers.

> 100 stockyards with more than 60 clients
> 400 stethoscopes deployed in both operations and academia
> 700 - 800 BRD new records per day
> 300,000+ patient records with outcomes
> Guaranteed performance
> 52 animals saved per year = $62,400 - $78,000

More Information

About Logic PD

Logic PD covers the entire product lifecycle with analytics and research, design, engineering and manufacturing and product support services.