HYPERLEDGER FOUNDATION

Case Study

Fujitsu and Botanical Water Technologies create the world's first global water trading platform using Hyperledger Fabric

Botanical Water Technologies

- Breakthrough technology recovers water wasted in the fruit and vegetable concentration process
- Process invented in 2012; company formed in 2017
- Live projects currently running in Australia and California

Goals

- To create the world's first global water trading platform
- To track, trace, and certify every transaction
- To positively impact 100 million of the world's most vulnerable people by 2025

Approach

1. Study the business problem
2. Define the requirements in detail
3. Find a technology partner who supports the vision
4. Build the infrastructure
5. Expand the network and ecosystem

Results

- Botanical Water Exchange (BWX) came online in Q2 2022
- A standard Water Harvesting Unit (WHU) can harvest ~460,000 liters or ~122,000 gallons per day.
- Once fully deployed, up to 3 trillion liters (equivalent to ~1.2 million Olympic Sized Swimming pools) of potable water can be created from over 10,000 processors every year
- The aim is to provide clean drinking water to 100 million of the world's most vulnerable people by 2025

A new solution to water scarcity

Water is the most precious resource on Earth. But with more and more storms, floods, and droughts, it's not always where we need it.

The UN says 4 billion people—half the world's population—face severe water shortages at least one month a year.

Now a breakthrough technology can make a huge impact.

Botanical Water Technologies (BWT) from Australia found a way to recover the water usually wasted making alcohol, juice, ketchup, and sugar.

BWT estimates 3 trillion liters of water are wasted this way every year. If that water were recovered, it could be reused, commercially sold or gifted to people who need it most.

The company had a working process. But to scale up and handle this enormous amount of volume, BWT needed to find a way to connect water buyers and sellers on a global scale.

They asked Fujitsu to develop a world-first: Botanical Water Exchange (BWX) that securely tracks every drop of water from producer to end consumer. That exchange is powered by the leading open-source framework for enterprise blockchains, Hyperledger Fabric.

The genesis of plant-sourced water

A chemical engineer working in the wine industry in Australia noticed how much water was wasted. So, he set to work to recapture the water normally lost in processing fruit and vegetables. By 2012 he had a working prototype of a novel system.

Australian entrepreneur and impact investor Terry Paule was intrigued. By 2017, he had started a company called Botanical Water Technologies (BWT) to commercialize and corporatize the process.

"Juice concentrators, sugar mills, ketchup makers, and distilleries all extract water from plants," says Paule. "And that water is often thrown away, to environmental detriment."

Botanical Water estimates 3 trillion liters of water is wasted this way every year— enough to fill more than a million Olympic-sized swimming pools!

The BWT technology is housed in shipping containers and connected up to existing systems that process fruit, vegetables, or sugar cane.

"A 40-foot shipping container can recover close to half a million liters of clean water a day," says Paule. "We capture it, purify it, and create the world's most sustainable drinking water."

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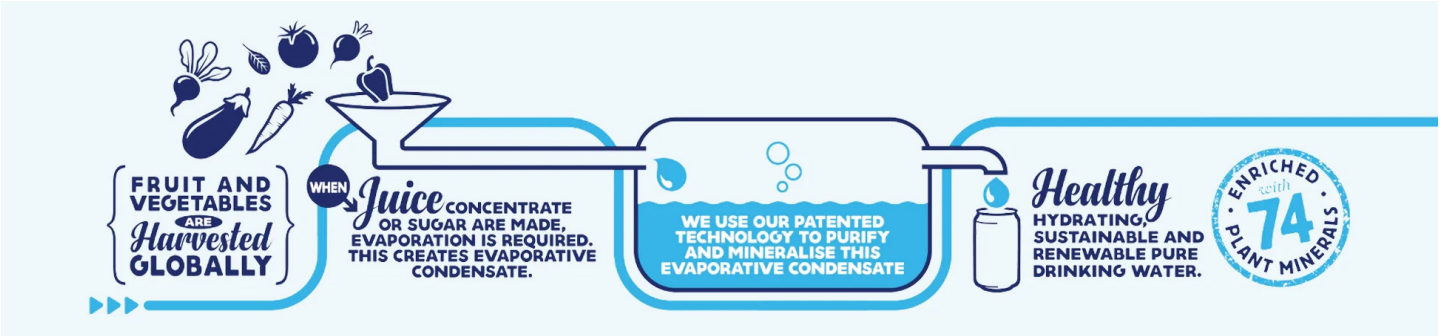
Studying the business problem

Water needs to keep flowing, and BWT wanted to provide a new source of water to people and places that need it most.

Paule and his team saw five key streams their water could follow:

1. Sold as WICs to corporates looking to offset their water usage and achieve their sustainability goals through certified environmental and social programs
2. Gifted to the world’s most vulnerable people at no cost
3. Purchased as ingredient water by a manufacturer
4. Reused by the same producer and create a circular economy
5. Sold as a new brand of bottled water called AquaBotanical

Drawing from proof of concept projects in Australia and California, the company created a brand of bottled water called AquaBotanical. Now sold in stores, served in restaurants, and available online, this water has won numerous awards for taste, quality and innovation.



Infographic © AquaBotanical

But Industrial-scale water is heavy. There’s no point recovering it in Australia and then shipping it halfway around the world: That would burn enough energy to cancel out any environmental benefits. Water is a local problem, and BWT offers a local solution utilizing decentralized infrastructure.

Defining the requirements in detail

The next challenge was creating a marketplace for buyers and sellers of plant-sourced water. This "water exchange" would support three different transactions:

- Sales of actual water for food, beverage and other manufacturers
- Sales of WICs to help fulfill corporate water stewardship goals
- Bulk donations of water to the world's most vulnerable people

In the first case, companies could buy water to make products like beverages.

Second, companies could deal in WICs to offset the huge volume of water they use, for example, to make paper, plastics, textiles, or to cool data centers.

"Suppose a company wants to buy 100 million liters of water because they use so much water to cool a data center in California," says Paule. "They could buy WICs on the Botanical Water Exchange, and then have captured water from a fruit processor in California delivered to local communities through accredited NGOs."

Those WICs could be noted in the company's Environmental, Social, and Governance (ESG) reporting which is becoming a critical metric for more and more investors.

And third, to meet its own ESG goals, BWT wanted to give away at least 1% of all the water traded on the exchange via the Botanical Water Foundation.

Water sales, credits, and donations, all tracked and trusted: That made an ambitious set of requirements for the new water exchange.

"We were keen to start with the business problem. But this is also about making a better world."

— Frederik De Breuck, Chief Digital Officer / CTO Fujitsu Belgium, Head of the Enterprise Blockchain Track and Trust Solution Center and Head of Innovation of Digital Shifts, *Fujitsu Uvance*

Finding a technology partner that supports the vision

BWT went looking for a technology partner that could appreciate what they wanted to build. Over 20 global technology providers were engaged over 12 months and were assessed based on an extensive evaluation criteria. That led them to formally appointing the Fujitsu Enterprise Blockchain Track and Trust Solution Center in Brussels, Belgium.

The Fujitsu team saw the vast potential of the water exchange and why it needed a global ecosystem.

“You cannot do this in isolation; you have to look at your ecosystem,” says Frederik De Breuck, Head of the Solution Center. “It’s important that you have the triangle of people, process, and technology coming together.”

“So we were keen to start with the business problem,” he says, “but this is also about making a better world.”

Paule and his team liked that approach and called it “a meeting of the minds.”

“We selected Fujitsu as a partner because they weren’t just giving us tech for tech’s sake. It was tech for real-world solutions,” he says. “Fujitsu has been a perfect partner, I must say.”

The two companies set out to build the world’s first-ever global water exchange.

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Building the infrastructure

De Breuck’s team started by analyzing the water exchange in depth.

“We captured all the main transactions that would happen on the platform,” he says, and ended up with 27 different personas and 100 business rules.

And they decided a blockchain would work well for the project. Why not just a database?

“That doesn’t give all the benefits you want,” says De Breuck. “You want to make absolutely sure everyone is looking at the same data. You need to bring trust to an untrusted situation. You also want to remove some of the normal operational frictions.”

One big, expensive friction could be certifying the WICs.

“We need to certify that the water came from somewhere and went somewhere,” says Paule. “Blockchain makes the auditors’ job easy because the information is not held centrally where someone could manipulate it.”

So using a blockchain would save money on auditing as well as removing other intermediaries, therefore reducing costs and time and adding trust to the new system.

The next question: Which blockchain?

“We went with a private permissioned blockchain based on Hyperledger Fabric,” notes De Breuck. “That can solve complex business problems using all the benefits of blockchain technology, so you know exactly who does what, when, and why.”

That appealed to Paule as well.

“Everything done on the exchange is underpinned by the blockchain, so the data is verified and immutable,” he says. “It’s the best data you can get. That’s why we like blockchain.”

BWT envisions a future where a real-time wall display quantifies the amount of water harvested and delivered, along with the positive impact made to people and the environment. That display will be based on the “digital twin” of each WHU with its operations tracked by IoT sensors...all securely recorded on the blockchain.

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Building out a network and ecosystem

The water exchange went live in the second quarter of 2022.

The platform is now testing all functions and features with a selection of key partners in the U.S., Australia, and India. A standard WHU can harvest ~460,000 liters or ~122,000 gallons per day. The BWX doesn't only allow producers and buyers to trade. It also covers production planning, logistics planning, and value chain management. In addition, it interfaces with the WHU's software for audit and certification purposes, tracing over 170 touchpoints and sensors per WHU.

With key partners onboarded and more than 100 large international enterprises confirming their ambitions and desire to start the know your customer (KYC) process to sign up, the next step is for BWT and Fujitsu to build out the network and expand the ecosystem. And, as the world heats up, there's no time to waste.

"This has been an interesting journey for us. We believe in building this kind of enterprise blockchain platform," says De Breuck. "Now we have to think big and scale fast. I want botanical water to really accelerate, create momentum, and go for it, because this can make a big difference."

And BWT is up for the challenge.

"It's a game-changer, the ability to harvest the water that naturally occurs in plants," says Paule. "And our goal is to deliver water to 100 million of the world's most vulnerable people by 2025."

If that dream comes true, it will be a win-win-win for water producers, industrial users, and vulnerable communities, all supported by Hyperledger Fabric.

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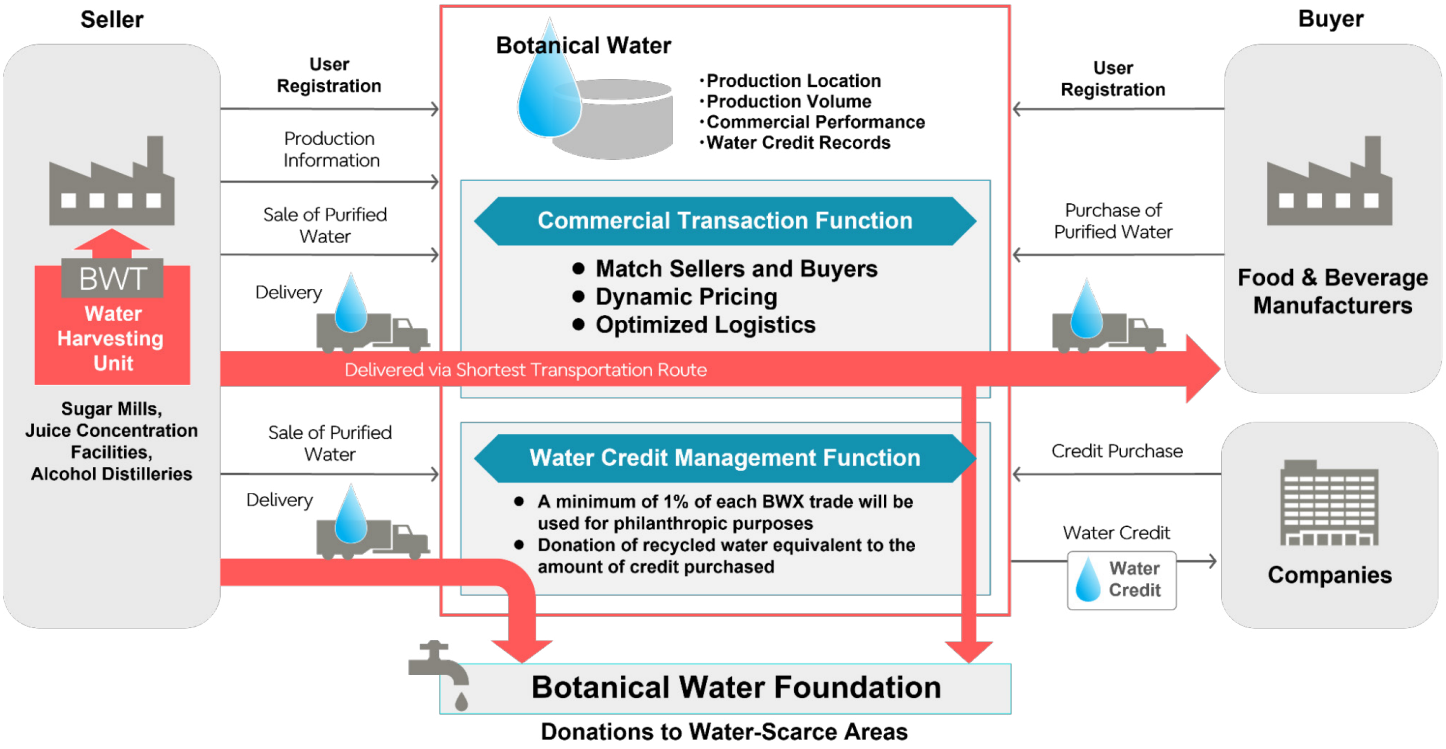
Seller
Buyer
Botanical Water
·Production Location
·Production Volume
·Commercial Performance
·Water Credit Records
User Registration
Production Information
Sale of Purified Water
Delivery
BWT
Water Harvesting Unit
Sugar Mills, Juice Concentration Facilities, Alcohol Distilleries
Commercial Transaction Function
● Match Sellers and Buyers
● Dynamic Pricing
● Optimized Logistics
User Registration
Purchase of Purified Water
Food & Beverage Manufacturers
Delivered via Shortest Transportation Route
Sale of Purified Water
Delivery
Water Credit Management Function
● A minimum of 1% of each BWX trade will be used for philanthropic purposes
● Donation of recycled water equivalent to the amount of credit purchased
Credit Purchase
Water Credit
Water Credit
Companies
Botanical Water Foundation
Donations to Water-Scarce Areas

About Fujitsu

Fujitsu's purpose is to make the world more sustainable by building trust in society through innovation. As the digital transformation partner of choice for customers in over 100 countries, our 124,000 employees work to resolve some of the greatest challenges facing humanity.

To learn more, visit Track and Trust DLT Supply Chain Solutions: Fujitsu Global

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About Botanical Water Technologies

Botanical Water Technologies (BWT) is positively impacting water scarcity by providing a new source of drinkable, sustainable, plant-sourced water for social and environmental projects.

We harvest water that naturally occurs in sugar cane, fruit and vegetable, which is used for the company's own retail brand, AquaBotanical Water. Botanical Water is distributed for retail, ingredient as well as social and environmental impact projects.

To learn more, visit www.wegrowwater.com

BOTANICAL WATER TECHNOLOGIES

About Hyperledger

Hyperledger Foundation was founded in 2015 to bring transparency and efficiency to the enterprise market by fostering a thriving ecosystem around open source blockchain software technologies.

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As a project of the Linux Foundation, Hyperledger Foundation coordinates a community of member and non-member organizations, individual contributors and software developers building enterprise-grade platforms, libraries, tools and solutions for multi-party systems using blockchain, distributed ledger, and related technologies. To learn more, visit https://www.hyperledger.org/

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