

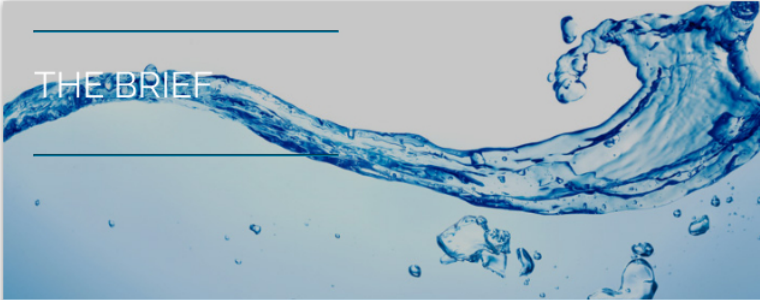
➤ HOW WE DID IT



DISCOVERY WORKSHOP

iBot works with the client to create a comprehensive requirements document through a discovery process.

1



## We want to disrupt our industry. Can you help us innovate?

An established water purifier manufacturer, with a respected brand and significant market share in India, aspired to disrupt the market which has become clogged with competition offering me-too products, as well as lower quality substitutes such as water in 20L cans. The company reached out to iBot requesting assistance in creation of a product as a service, so instead of selling

## MACHINE INTERFACE DEVELOPMENT



The heart of the connected machine is the revolutionary iQu tech, which was retrofitted into this machine.

2

requesting assistance in creation of a product-as-a-service – so instead of selling water purifiers, the manufacturer would sell purifier water. This would, predictably, significantly disrupt the purified water market by unsettling the competition from 20L cans as well as the me-too sellers.

iBot worked with the client on several aspects of the new offering – market assessment, product manufacturing, service, and payments by customers. The iBot R&D disassembled the product to understand its function in detail. Workshops were held with other stakeholders within the client organizations to understand manufacturing, service, finance and marketing requirements and dependencies so that iBot's solution incorporated these requirements into the solution.

## MACHINE INTERFACE DEVELOPMENT

The client's water purifier has been a great market success, and is robustly designed to purify water. However, it is essentially a mechanical equipment which purifies water, lacking in any controls and manageability. For example, while it dispensed purified water, there is no mechanism to measure the quantity of water dispensed. This being the core attribute of "prepaid water" model, the two teams identified a flow sensor after trying out several available in the market. This flow sensor is now the core component of this product design.

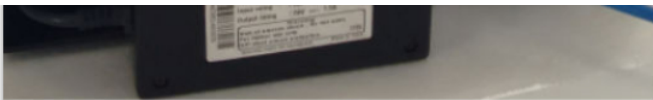
A solenoid valve was also added subsequently to ensure that the flow of dispensed water could be stopped when the balance in water account of the consumer reduces to 0. This addresses a concern from Finance function regarding revenue leakages.

The client's engineering team started further exploring additional opportunities for automation of the product once they realized that the product can be made more intelligent. A Low Pressure Switch (LPS) and a Level Control Switch (LCS) were also designed to be controlled by iBot's iQu Connected Processor. Finally, the pump was also added as another equipment to be controlled by iQu.

Once these requirements were identified, a prototype of the integrated purifier with iBot iQu installed in it, was prepared. The interfaces between purifier and iBot were validated through the prototype.

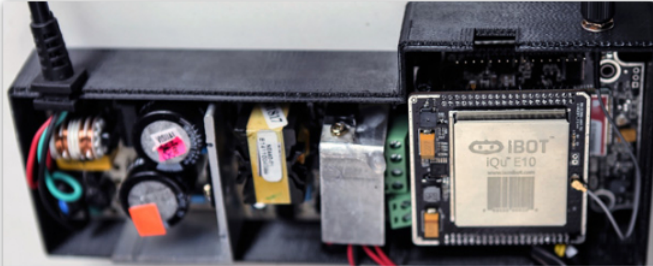
2 a





iBOT designed a Base Board which integrated iQu's interfaces with that of the components of the purifier. The iQu is installed on this Base Board using an 80-pin connector.

2 b



The electronics assembly comprising iQu and Base Board were integrated with the power adapter that powers the pump as well as iQu + Base Board assembly. These components collectively were installed inside a single box (again designed for the purpose). The box itself went through multiple iterations of design for attributes such as placement, fitment, and Electromagnetic Interference (EMI).

2 c



## APP DEVELOPMENT



IBOT's software engineers and designers create efficient and beautiful interfaces for the machine, user, and machine manufactures to talk to each other, securely.

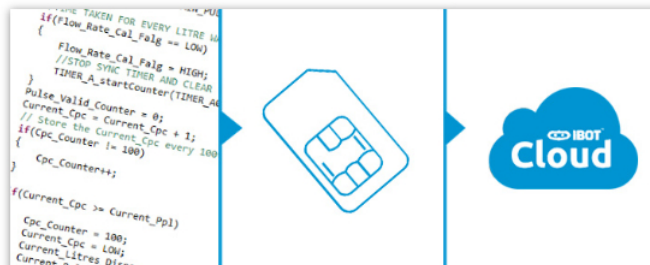
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## WRITING THE SOFTWARE

Firmware is the logic that powers the behaviour of iBot products. This is a specialized effort undertaken by skilled engineers who first understand the functionality required of the product, design the firmware and develop it. The firmware in the purifier focuses on the ability to precisely track quantity of water dispensed by consuming the information provided by flow sensor, as well as to stop the dispensing of water when the water account balance drops to 0. This prevents loss of revenue for our client.

The water flow data from the flow sensor is received, encrypted and stored on iQu, until it connects to iBot Hive when it sends the data there.

3 a



The firmware also manages the behaviour of pump, LCS and LPS – thus effectively controlling the overall behaviour of the purifier. It serves as the brain of the purifier.

A key task performed by the firmware is to connect the iQu and Base Boards to iBot Hive, iBot's cloud based platform. This part of the firmware receives the encrypted water flow data, stores it on flash storage, and then ships it to iBot Hive after establishing connectivity.

## MOBILE AND WEB DEVELOPMENT

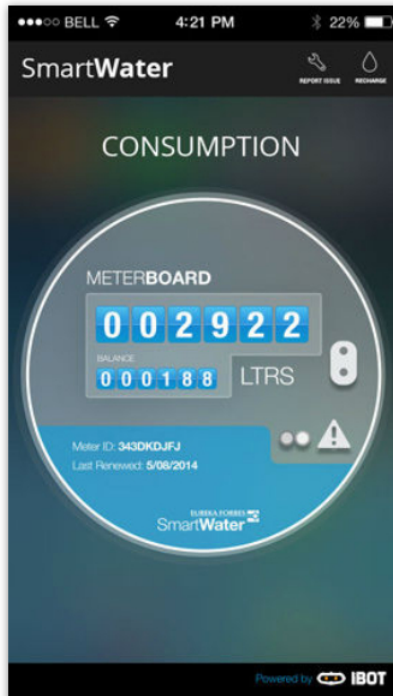


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## MOBILE AND WEB DEVELOPMENT

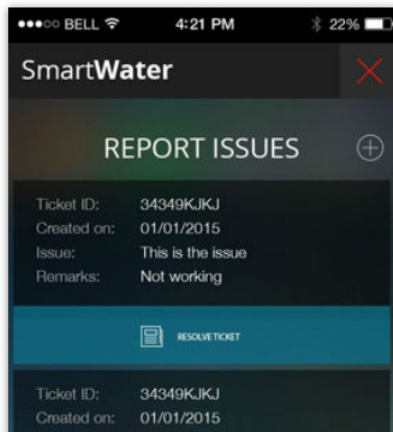
The ultimate success of a product reflects in its consumption by its target human audience. Our target audience are of two types. One set is the consumers who will have the purifier installed at home, and use the app to track water consumption, recharge water account, and in case required, report any issues. We engaged some smart UX designers (with a tattoo) to have this interface created. It has come out so well that we have already received positive feedback from everyone who has seen and experienced it.

4 a



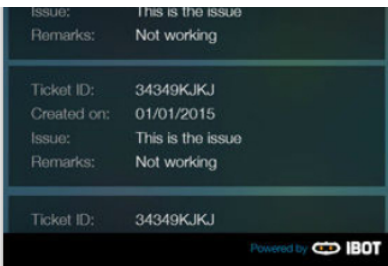
The app displays an innovative "Water Meter" which shows the quantity of water consumed by the customer since the start of this product, and the quantity of water in his/her water account.

4 b



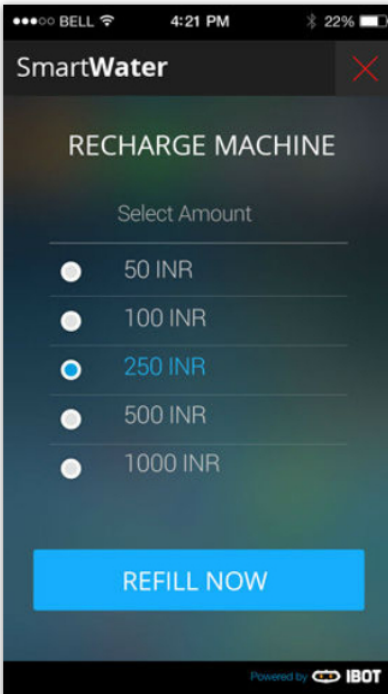
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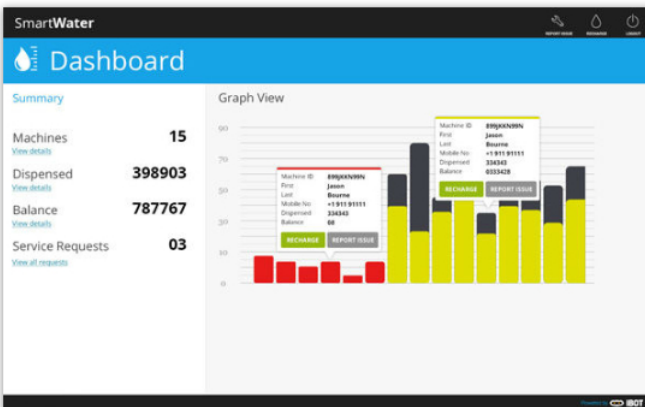
Another screen enables the customer to pay for additional litres of water using a credit card or other financial instrument.

4 c



And finally, a third screen which allows the customer to report a service issue.

4 d



The other target audiences iBot has are the Operations and Service management teams from the client organization. These teams have

an access-controller enterprise-grade web interface wherein they get to see the status of all purifiers across India, including the details of the customers. Service teams can review issues reported by the customers and plan action accordingly.

TESTING & GO LIVE

5

## SMART WATER GOES LIVE!



Since it is expected that several hundred thousand of these water purifiers will be deployed across the country, it is imperative that the product is thoroughly tested before it is released to market. Our product testing happened over several levels – hardware, firmware, and software – individually and an integrated manner. Further, the product was also subjected to external tests such as EMI, vibration and drop test. Once these tests validated the product's capability to withstand a sustained operation in normal usage conditions, it was approved for limited deployment, and subsequently for general deployment.