HOW WE DID IT

DISCOVERY WORKSHOP

1

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

THE BRIEF

A Solar Inverter is the gateway to solar power and the brain of a solar installation. A connected inverter is smarter inverter.

The customer is a leader in the inverter industry, with market domination in home inverter segment. The company entered the fledgling solar industry with a new inverter, and was seeking to differentiate itself from several other offerings that are present in the market today.

An investment into a rooftop solar plant is made with the intent of generating a

Return on Investment. And hence, the customer needs to know the quantum of power generated so far, being generated now, and likely to be generated tomorrow. Further, customers expect any performance deterioration to be addressed proactively so as to maintain the performance of the solar installation at optimal levels.

The customer conceptualized a "Connected Solar Inverter" which will continuously track performance of the installation, and upload it to the cloud – the information can then be consumed by the end-customer as well as the inverter manufacturer.

The customer, once its objective to develop the connected inverter was defined, quickly zeroed in on iBot's IOT platform, and decided to implement the solution on an accelerated basis.

MACHINE INTERFACE DEVELOPMENT

2

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

MACHINE INTERFACE DEVELOPMENT

The machine interface development for the solar inverter has been the fastest ever undertaken by iBot so far. It is also a shining example of how close collaboration between teams driven by an objective to succeed can lead to superior successes.

iBot and the customer agreed upon a date of demonstration of a connected inverter within 1 week. Once the date was finalized, an engineer flew down from New Delhi to Hyderabad along with the inverter controller, interface protocols, and other inputs necessary for establishing integration between the inverter and iQu Connected Processor. The teams worked aggressively for 3 days, and developed a hardware integration of the two products, so the inverter data was being received on the iQu Connected Processor.

2 a
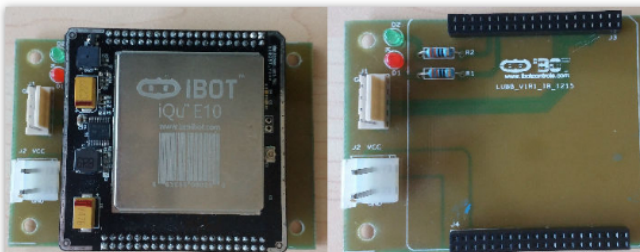
The hardware designs were subsequently refined, and an outcome of this engineering effort is the Base Board which integrates with iQu E10. Together, the Base Board and iQu E10 connect to the controller of the solar inverter, and transmit data to iBot Hive.

APP DEVELOPMENT

3

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

WRITING THE SOFTWARE

iBot engineers programmed the iQu E10 to interface and communicate with the inverter controller. This was accomplished by defining a protocol to be followed by the two systems, and the behaviour is in request-response model. iQu E10 sends a request to the inverter controller, and the inverter controller responds with data to iQu. The data received from the inverter is then prepared as a string of values, encrypted by iQu E10's microprocessor, and stored on the local storage until connectivity is established and this data is transmitted to the cloud on a secure channel.

Some key parameters which are captured from the inverter and transmitted to cloud are:

- Key Machine Identifiers (Machine ID, Model)
- Charging and Discharging Currents
- PV Voltage and Current
- Mains and Output Voltages
- Battery Type, Battery Status Indication, Present Battery Ah
- Load Status
- Over and Under Voltage Flags
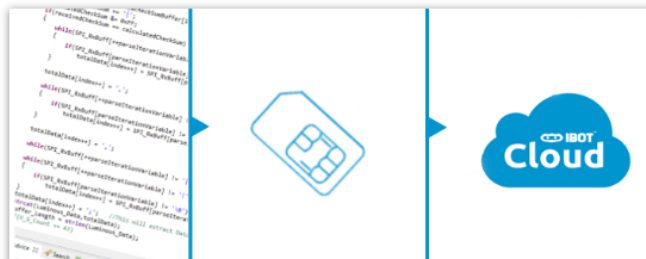- Inverter and Ambient Temperatures

MOBILE AND WEB DEVELOPMENT

4

MOBILE AND WEB DEVELOPMENT

The consumer (owner of the solar infrastructure) is the target for the mobile app. He would like to know the quantum of power generated, and health of the installation. iBot's customer designed a mobile app which provides this information.
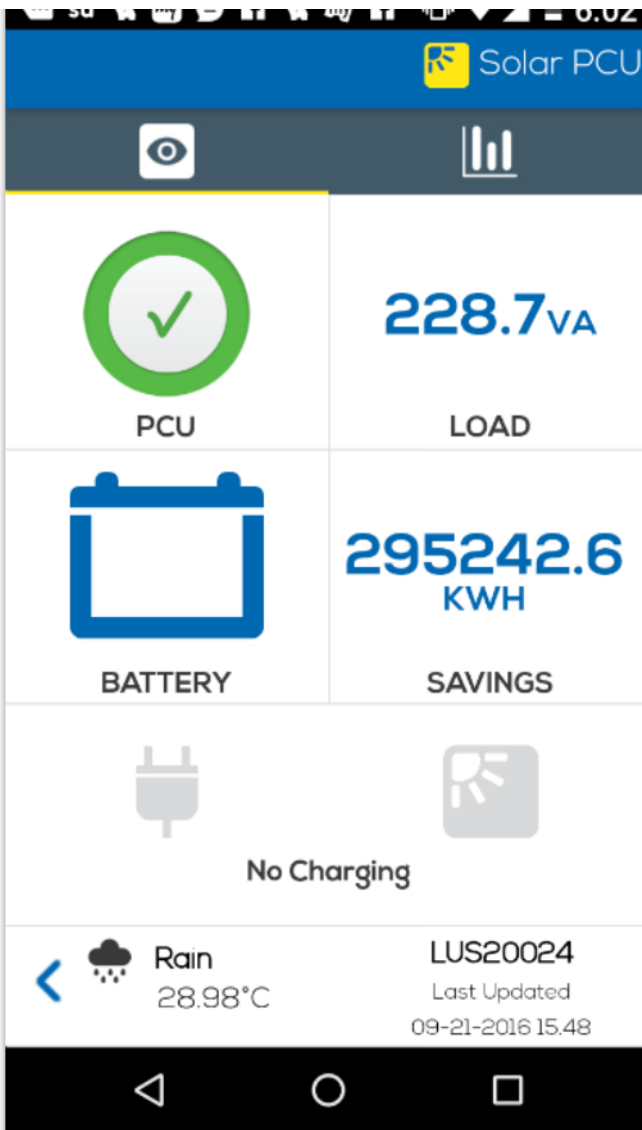
4 a

The mobile app enables the customer to choose his inverter installation, and then view the operating status of the solar panels.
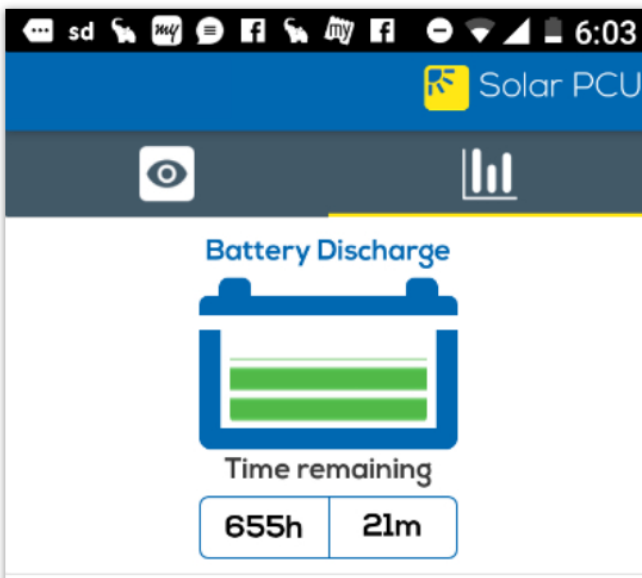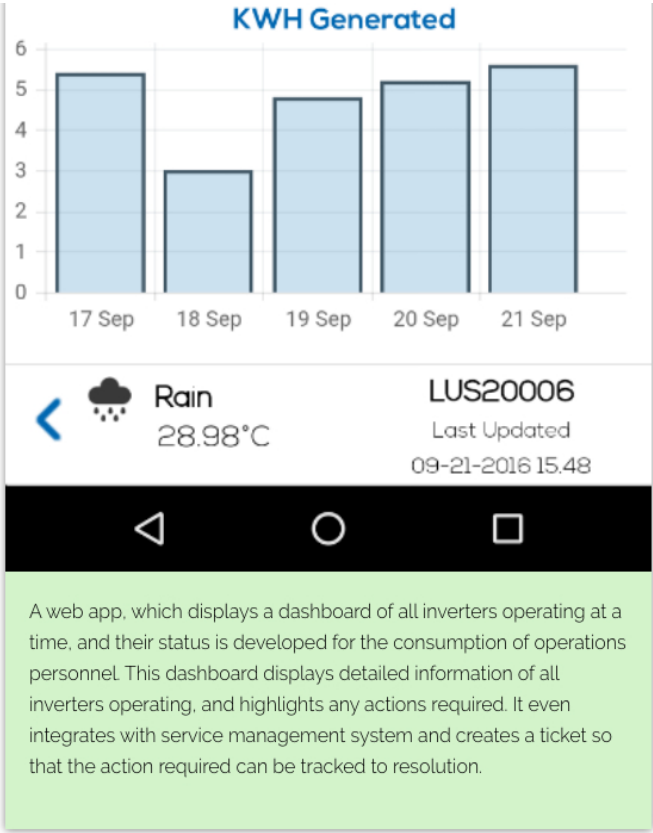
6:02

Solar PCU

228.7 VA

LOAD

295242.6
KWH

SAVINGS

PCU

BATTERY

No Charging

Rain
28.98°C

LUS20024
Last Updated
09-21-2016 15.48

A technician app is also developed, and this app displays lot more technical details of the solar infrastructure so as to enable the technician to diagnose any issue, and plan action for resolution even before he leaves his office for the service call.

sd   6:03

Solar PCU

Battery Discharge

Time remaining

655h   21m

KWH Generated

Rain
28.98°C

LUS20006
Last Updated
09-21-2016 15.48

A web app, which displays a dashboard of all inverters operating at a time, and their status is developed for the consumption of operations personnel. This dashboard displays detailed information of all inverters operating, and highlights any actions required. It even integrates with service management system and creates a ticket so that the action required can be tracked to resolution.

IQU POWERS SMART INVERTER IN 7 DAYS!

Microsoft & iBot Power New Internet of Things (IOT) Enabled Smart Solar Inverter from Luminous

iQu Connected Processor-enabled inverter has undergone rigorous testing, starting with unit testing of all components, and culminating into the full-scale integration testing with several installations live across the country. Consumer feedback is being collected, and refinements to the solution will follow in subsequent releases of the product.
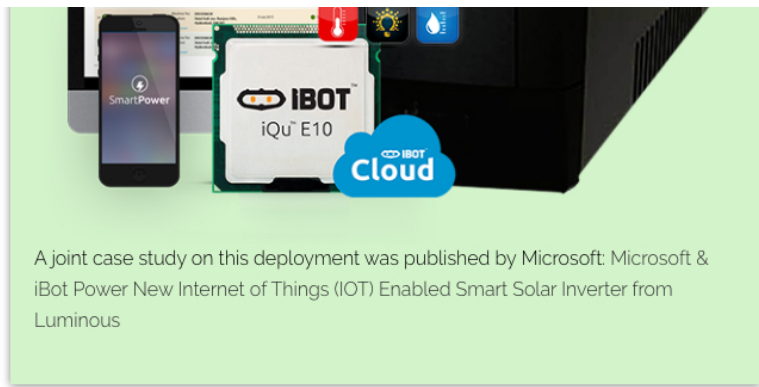
A joint case study on this deployment was published by Microsoft: Microsoft & iBot Power New Internet of Things (IOT) Enabled Smart Solar Inverter from Luminous