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Customer

A US based company that provides innovative products and solutions in the Industrial and Energy domain

Problem Statement/Requirements

The customer business consists of innovative products and solutions which are meant for rural regions across the world and hence need to be very cost effective without compromising on quality or functionality. The specific project scope consisted of design, development and prototyping an Industrial IoT solution for monitoring and control power generation and distribution systems. The customer had very stringent solution pricing strategy along with complex real time algorithms to be implemented in the end devices. SFO has designed and delivered end to end solution consisting of field IoT hardware / embedded devices, communication network, local real-time interface software and cloud based central monitoring & control software.

Solution Methodology

This was a concept to build project wherein SFO had to come up with detailed specification of the solution from customer's business needs. SFO did the detailed specification of complete IoT and monitoring solution starting with field IoT devices, embedded intelligence in the end devices, RF communication network, on-site monitoring software and central cloud based monitoring and control software.

Based on the approved specification, SFO further designed and developed the solution, prototyped and field tested before finally delivering to the customer. The various components in the solution were:

- Generation monitoring device, data acquisition and integration
- Distribution control and monitoring devices hardware, firmware and communication module
- Designing & implementing RF based mesh communication network
- Real-time monitoring and control software which provides two-way communication with the system to control, monitor, data acquisition, historian and command & control interface
- Cloud implementation to remote control, monitor, configure, manage and report for multiple installations spread across geographically

SFO's software team visited the client sites to fully understand the environment where the product would be deployed. SFO's team consisted of multi-disciplinary members consisting of hardware engineers, firmware engineers, software architects, developers, electronics engineers and testing Experts.

Other highlights of the solution were:

- Customized low-cost solution was developed based on customer price targets.
- Reduction in operational cost by custom implementation of RF network in the license free band.
- Auxiliary range extender devices to increase RF mesh reachability.
- Auxiliary RF based display unit for end consumer notifications.
- Easy & fast implementation & commissioning of field IoT devices along with its communication network.
- Implementation of algorithms to automatically detect abnormal conditions and take corrective actions, thereby reducing need for local experts.
- A cloud based solution for experts to monitor remotely and carry out actions required to upkeep of the power generation system thereby reducing need for field visits.
- Provision for multiple levels of authorization to the system.

Brief description of product:

a) Hardware

- ARM Cortex M3 Sub -1 GHz RF SoC (Microcontroller unit)
- Poly channel AFE
- Digital Outputs, CTs
- External RTC controller
- External Flash and EEPROM
- Power failure, Overcurrent & Tamper sensors
- RF supporting auxiliary display unit with battery

b) Software

- C++, Java J2EE, Spring, Hibernate, Angular JS, Bootstrap, HTML5, Amazon web service cloud, Jasper Dynamic reporting, Highchart

c) Firmware

- OS : Embedded Unix based OS, Ubuntu 14.04 LTS
- Programming Language: C
- Networking protocols: 6LPAN Suit, TCP/IP, IPV6
- Drivers: RF, RTC, AFE, Flash, EEPROM, DO & DI controllers
- Tool Chain: GNU

d) Compliance

- CMMI ML5
- ISO 9001 : 2015
- ISO 27001 : 2013

Impact

- a) A cost-effective and effective IoT solution for control and monitoring of power generation and distribution
- b) Quick to install and operate.
- c) Cloud based monitoring & control, virtually carry out most of important actions remotely, thereby eliminating need for expert man power locally which is very essential for rural region applications

About SFO

SFO Technologies Pvt Ltd, the flagship arm of the diversified conglomerate, the NeST Group provides end-to-end design-engineering-software-manufacturing solutions to clients across geographies such as the USA, Canada, Europe, Middle East, South East Asia, Japan, Australia, and India. SFO has invested in building competence, scale and standards compliant process framework, in PCBA, fibre optics, Cable & wire Harness, Magnetics, High Level Assembly, VLSI design, embedded software development, etc. SFO's capabilities transcend the plain vanilla "Build-to-Spec or Build-to-Print" EMS and our ODM+ solutions are rapidly re-defining standards for the OEMs across Aerospace & Defence, Communications, Transportation, Healthcare and Energy & Industrial domains. .



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