Addressing Interoperability in Industrial IoT Solutions

Industrial Internet of Things or Industry 4.0 is the latest wave of technological change with potential to bring unprecedented opportunities to businesses. With an estimated 50 billion devices expected to be connected via the internet by 2020, the IIoT revolution will dramatically alter or disrupt business models in manufacturing, retail, transportation, agriculture, oil and gas, power, wind and other industrial sectors. This disruption will come from new value creation made possible by massive volumes of data or 'Big Data' from connected devices and the increased ability to analyze in real time and make decisions or take actions from those insights. To realize the full potential of Industrial Internet, businesses need to overcome several important challenges, especially the lack of interoperability among existing or brownfield systems. Today's operational technology systems [OT] largely work in silos and this increases the complexity and cost of IIoT deployments. A fully functional IoT solution will require seamless data sharing between machines from different manufacturers and other complex systems within an organization. This paper presents a use case where Infodat Digital built an IoT Solution that brings field data from different industrial assets operating with multiple data acquisition protocols [Foundation Fieldbus, PROFINET, PROFIBUS, MODBUS, WITS, TwinCAT ADS] seamlessly to the decision makers with reduced complexity using Azure IoT Suite. The availability of this real-time data via a low cost IoT deployment generated tangible insights that were actionable, predictive and relevant to the business operations.

Challenge

In drilling operations, real time availability of wellsite data to operators or engineers allow faster decision making, reduce rig operating costs, greatly helps avoid drilling hazards, and all-in-all improves drilling efficiency. The legacy software application collected various parameters such as depth, motor RPMs, temperature, flow, pressure and other engineering parameters which are critical to monitor during the drilling operations. This data was collected from PLCs via few protocols as well as other 3rd party hardware. The application where Server modules communicated with hardware, configuration settings GUI, Database connections, maintenance modules consumed lots of in memory and was limited to updates on real time data every 10 seconds only. A few data types were only supported, thus limiting the extraction/movement of data from other systems, complicated or near impossible. Access to visualizations, real-time insights required large development time turning this into a complex and costly project to upgrade.

Solution

Infodat Digital developed an IIoT Solution that was approximately 30% cheaper to build and deploy. Azure IoT technologies dramatically reduced the software development cycle. The solution was re-architected with scalability and low total ownership costs in mind. Our software is designed to connect legacy devices and sensors to the Industrial Cloud without having to replace existing infrastructure. Drawing on our expertise as Systems Integrator, we utilized mature technologies and connectivity provider protocols that made it simpler to connect industrial assets to the cloud. SDKs available in Azure IoT make it easy not only to push data to Cloud easily, but it is done in a secured manner. The key benefits from this solution are summarized below in Fig 1, while the solution architecture is shown in Figure 2.

More than
60%
faster

Speed of Developing Solution

Up to
25%
improvement

Data to Decision Cycle Time

Upwards of
30%
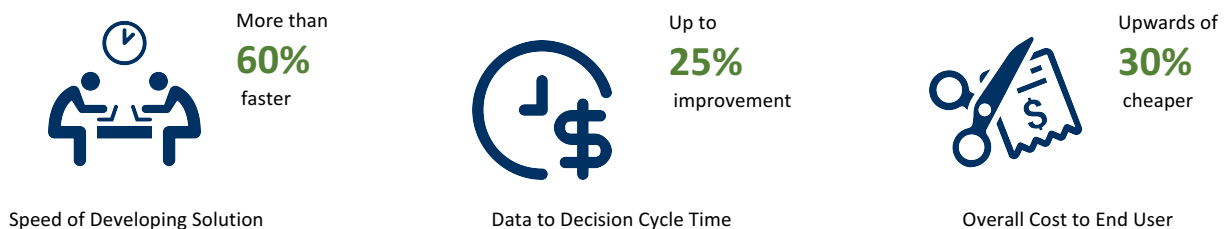cheaper

Overall Cost to End User

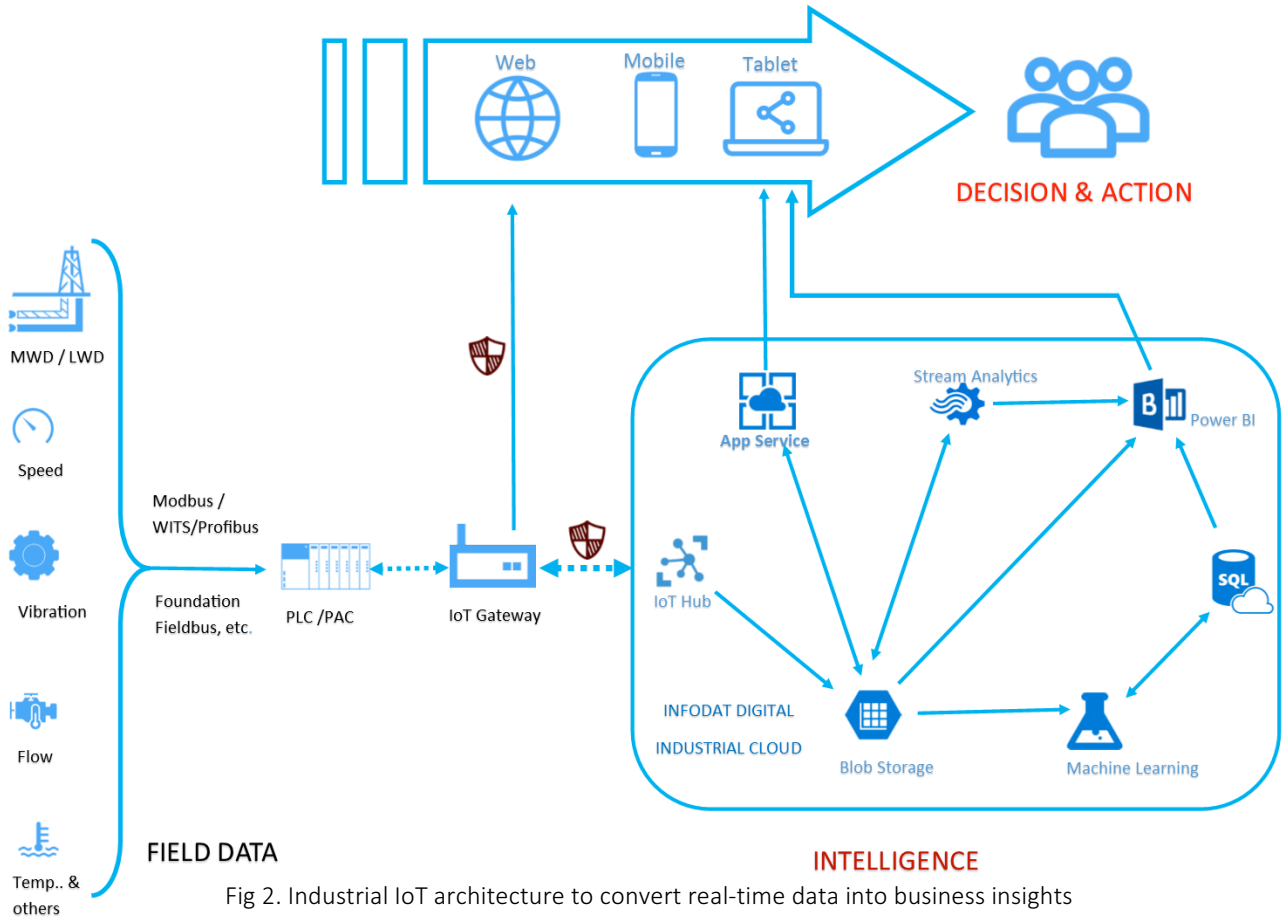Fig 1. Infodat Digital IoT Solutions increase productivity

Fig 2. Industrial IoT architecture to convert real-time data into business insights

All facility data from various machines communicating through multiple protocols is routed through an Industrial IoT Gateway. Threat modelling approach is taken in the solution to combat cybersecurity risks. The connection from the Gateway to Cloud is protected end-to-end that protects the privacy and integrity of the communication route.

In summary, with the quick deployment of a comprehensive Internet of Things solution in a complex system such as Oil and Gas Drilling Operations, the conversation in today's landscape has quickly turned from "How do I get data from these various systems or Can I get data from multiple sources any faster from field" to "What insights are now possible with this real time streaming of data". At Infodat Digital, we specialize in integrating your existing devices and systems with Industrial IoT Solutions and allow your organization to embark on a digital transformation journey that allows you to turn raw data into actionable decisions, thus providing a competitive edge for your business.

Contact Us for IoT Proof of Concept. Discover Insights.

We can tailor IoT Solutions to your specific needs, helping you uncover data and insights that transform your business and bring new opportunities. Visit us at www.infodatdigital.com or email us at info@infodatdigital.com.

Authors:

Sagar Asalapuram, P.E.: With an experience spanning a decade in Subsea Oil & Gas Industry, Sagar is a leader in applying Systems Engineering and innovative IT & OT technologies to solutions that help organizations achieve more.

Subra Kadiyala: Co-founder and Executive Vice President of Infodat Intl. Inc., Subra is a leader and major driving force behind various large scale IT projects in Embedded Systems, Oil and Gas and Manufacturing and has been at the forefront of directing Industry 4.0 technology development.