Pump By Exception Powers Oilfields To Do Much More With The Same

By Shrivan Kamdar
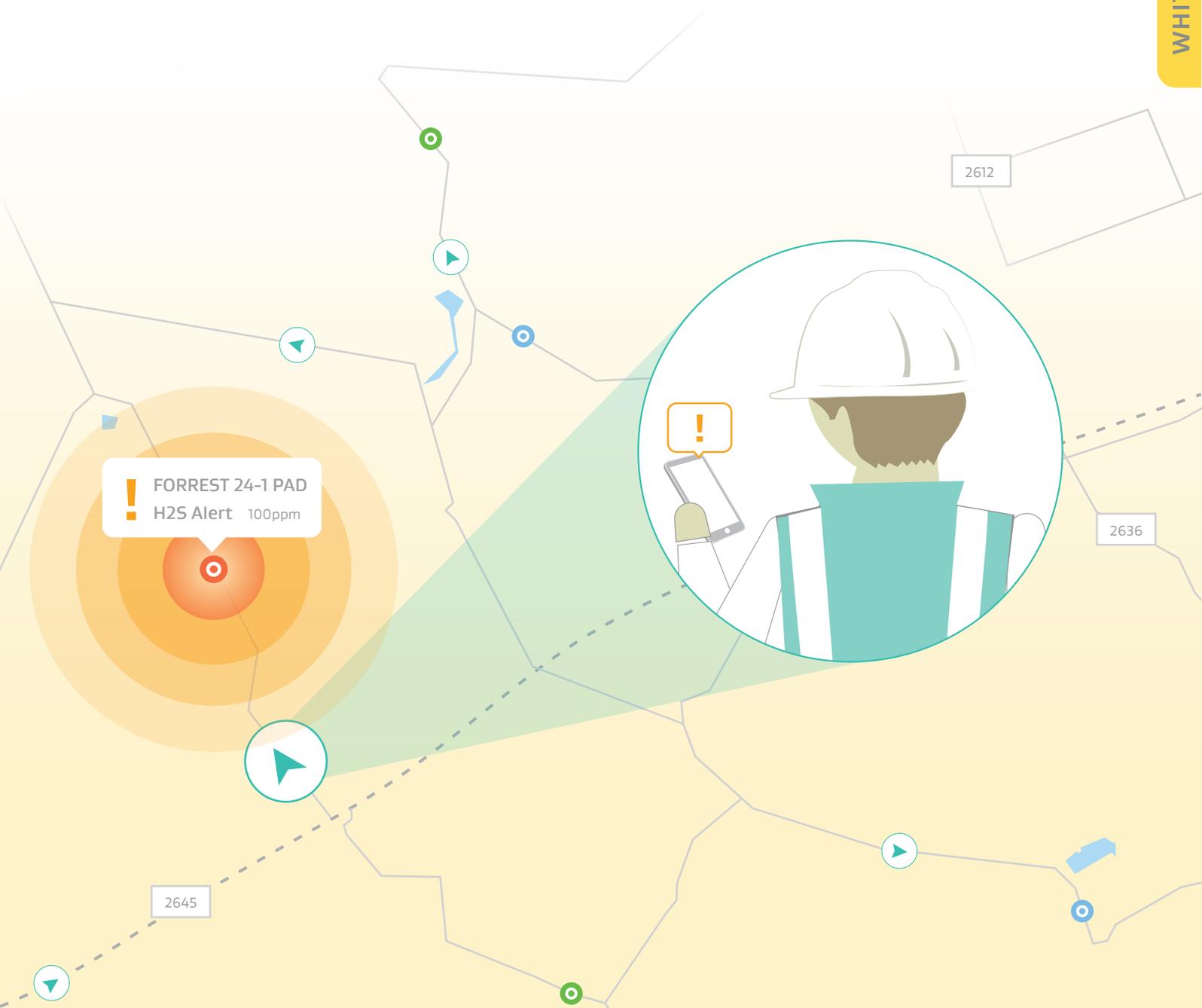
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Roadblocks To The Fully Connected Oilfield

The path to profitable growth in today's oilfield requires sustaining the operational constitution from recent lean times. As companies make plans to grow assets, they are also looking to equip existing field workers to handle the expansion. That requires the industry to make the leap to a route-less field that pumps by exception.

While pump by exception has been there as a business concept, to date it has failed to take off as a repeatable process that connects the entire oilfield. Managing set routes, dispatching resources and tasks centrally, and making office drives to deliver for paper tickets – all bleed valuable uptime.

Now, technologies exist to truly design a connected oilfield that pumps only by exception. In the era of mobility, cloud and artificial intelligence, the industry must rise up and demand much more from technology to disrupt set ways in the oilfield.

Old school route management, central dispatching and complex web interface architectures stand in the way of growing exponentially as they limit the productive use of every worker's time. Growth in such scenarios stymies without adding to operational expenses, a maxim that defeats profitable growth objectives. Pump by exception for everyone in the oilfield breaks this cycle by equipping every worker to accomplish more as they cater to the highest priority tasks, with less friction and complete transparency.

Established Route Management

Oilfields are managing routes today, and change will not come without simpler technology to follow. Today, most lease operators set out on their scheduled, routine routes, inspecting, capturing and validating readings – often still grasping onto paper or spreadsheets. This practice is almost an established ritual in most oilfields – the set routes, the drive around and the strenuous stock taking back at station, day after day, every day.

Forward thinking companies have taken advantage of mobile technologies and made field data capture more intuitive. However, that only solves one of the several activities. The operators are still chasing job orders coming from different systems, filling out forms, looking at different apps for SCADA alerts and updating excel sheets.

The more systems and back office personnel the field has to comply with, the less time it gets to actually pump by exception. Mobile and cloud technologies can liberate them from routine, stone carved routes and chasing multiple systems with seamless integration, making workflows simpler.

Over-Engineered Central Dispatch Centers

Back office, field office or Operations Control Centre, there may be a different name to it in each oilfield but they all perform the role of central dispatch - maneuvering every field activity and directing the next stop for each worker. And, given the complex web of information they must navigate, their ability to get the right resource to address the most critical tasks with speed, is limited by the last mile in the field. Keep this manoeuvring out of picture and allow artificial intelligence to match every task to the right resource, intelligently.

Complex Back Office Systems And Unfriendly Interfaces

The EAMs, the ERPs, the Production Accounting systems, and multiple IoT systems – each with a different access and interface, each spread out in multiple touch points – suffocates productivity up to two hours per day in each field worker. Added to the complexity is the silos these operate in – no system speaks to the other. If a task requires a follow up, there is a maze of forms and systems to tackle before it can even be communicated, let alone addressed. Last mile communication where the loop is completed with feedback and resolution, is one of the biggest lacunae in oilfield. Synthesizing disparate data streams from multiple systems onto one platform with a mobile connect, takes away this complexity.

Large Internal IT "Build It Yourself" Approach

IT teams in oil and gas companies have burnt their fingers in building applications to address last mile connectivity issues, inhouse.

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Technologies Fueling Pump by Exception

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In the chase of an elusive pump by exception, a battery of consultants and investments in numerous systems have added more disappointments and less truly scalable solutions. For example, instead of taking advantage of Amazon Web Services for cloud, companies are still struggling to make sense of large infrastructure investments. In a similar manner, the variety of technology vendors opens up the aperture for companies to consider them for pump by exception solutions. Going at it alone or reinventing the wheel adds time to market that companies cannot afford.

Artificial intelligence, mobile and cloud technologies bring in meaningful automation and direct workers to the most suited tasks, instantly. Every activity in oilfield matters. And thus, everything would need attention, but on the descending order of priority. There are patterns that Artificial Intelligence identifies, unifies them by purpose, and brings speedy execution by cutting down nonconsequential actions. Technology can now elegantly direct the right worker to the most urgent tasks, keeping the well-defined uplift, cost and other variables in consideration. That paves the path to route-less fields and pump by exception. That liberates every worker from archaic routes to address the exceptions first.

Let's explore some use cases in the oilfields that Artificial Intelligence can address with its unique capabilities:

Resource-to-task matching

Think Uber, the ease of finding what one needs, right away, from anywhere. That is artificial intelligence working under the hood. Oilfields don't need to reinvent engines that have already been proven, they only need to adapt. Like most driving experiences today, make the oilfields route less or dynamically routed by leveraging operators' expertise optimally. A well-oiled artificial intelligence engine assesses work record, job success, location in the field and the criticality of an event; then, it matches resources to most critical task based on priority, skills and proximity.

For instance, a gas compressor needs attention at a particular well. A resource to task matching engine finds the most suited resource, skilled to handle the issue, and nearest to the location.

The engine considers cost thresholds, uplifts and priority ratings based on individual companies' inputs, setting clear expectations for business outcomes.

Integrated Intelligent Task Workflows and Work Orders

Think Amazon, and the seamless way in which activities are tracked, completed and communicated. Without requiring time consuming manual dispatching. Automated and intelligent workflows streamline each activity in the oilfield by breaking it down to executable tasks, put them all in one place, and connect everyone in the field and office. The field worker accesses every task in one place, on his mobile phone, without interrupting the task at hand. Why should he be juggling between systems to know where he is needed most? How does it matter where the task is assigned from, by a supervisor's phone call, by a back-office enterprise system, or by a risk-defined automated algorithm? Ultimately, for a worker in the field, it is a task at hand. He must also be able to update the status instantly or create a follow up task to ensure the loop is closed, without losing critical time out of his day.

Let's look at an event when the battery levels in a particular pad have gone down and the run tickets need to be validated. Artificial Intelligence based algorithms allocate the task to the nearest worker, who reaches the spot quickly, takes a picture of the run ticket to update all the required information in the system in one click. Image recognition ensures the data is captured and updated, while artificial intelligence matches the levels and points out any discrepancies.

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The back office gets a task complete notification, and there is no maze of work orders or driving miles to deposit paper tickets, and then spending days to validate the information. An intelligent workflow speeds up the process, connects everyone and takes away the back and forth manual dispatching. And, machine learning refines the workflows as they steep deeper in the process.

SCADA Data On One Platform

Synthesizing data from all SCADA and other IoT systems in one platform is now a necessity. Artificial Intelligence engine prioritizes alerts and intelligently navigates workers in the field.

Why do the millions of dollars' worth of investments in instrumentations fall short in adoption? When field workers juggle different systems, chase several competing alarms, followed by central dispatch phone calls, adoption drops and change in behavior plateaus. There has to be a method to the madness, it must be made easier for the field teams to address priorities. Synthesizing data from all SCADA and other IoT systems in one platform is now a necessity. Artificial Intelligence engine prioritizes alerts and intelligently navigates workers in the field. Added to this, triggered alerts, based on predefined risk matrix, or specific geofence ensure better safety in instances of hazardous spills or leaks.
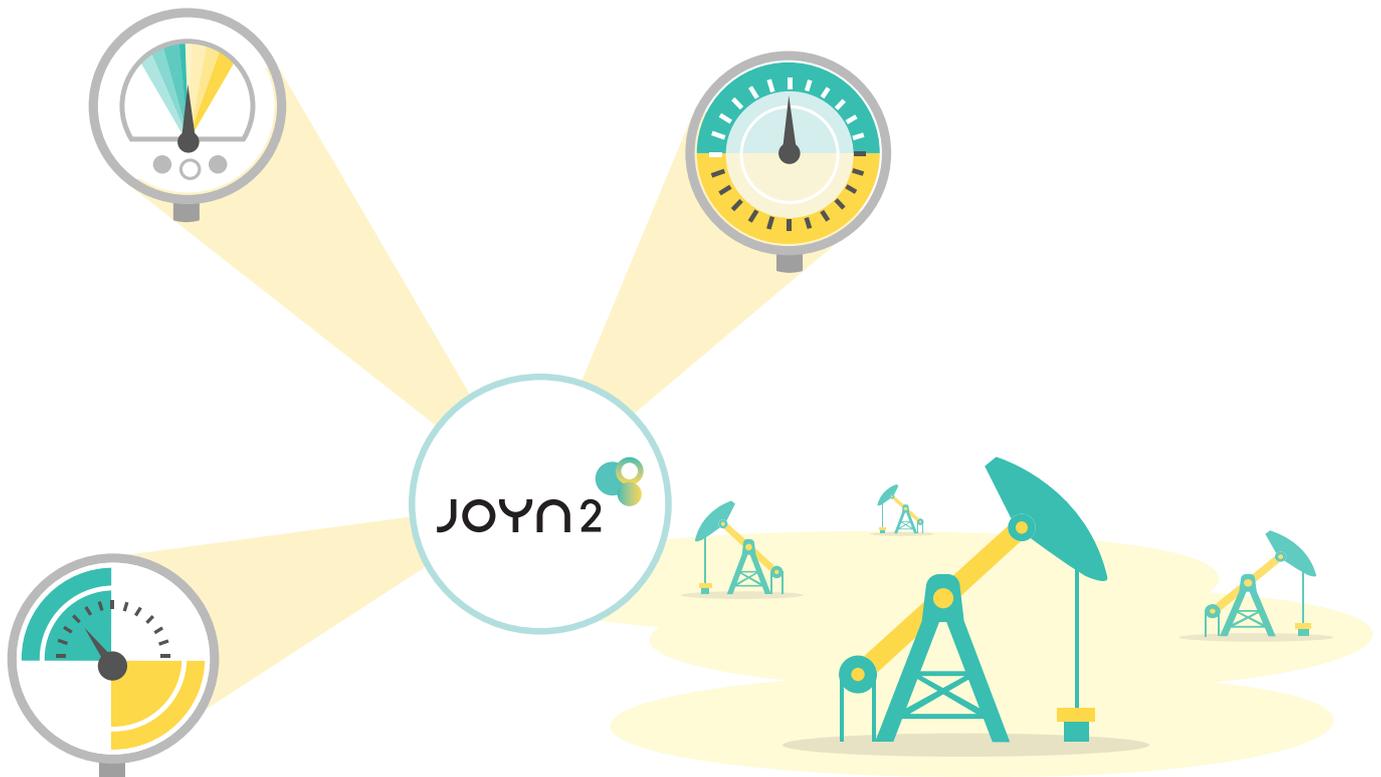
Scalability of Cloud

Oilfields need a cloud-based platform with inbuilt scalability to manage thousands of terabytes of data every second. Thus, the workers do not miss the critical instances in chaos and compromise on safety - theirs or that of equipment. Synthesized and harmonized data irrespective of volume and velocity, translates to clear insights for informed action, immediately. Cloud based platform also means easy access to insights on a device of choice, on demand. Now, the oilfields own the data and have unhindered access to it for more accurate decisions.

Every Task, One Platform

While oilfields may be attempting to get these capabilities in bits and pieces or scattered across systems, it is the ability to bring all the tasks together in one platform that makes pump by exception a reality. The strength of artificial intelligence and the precision of machine learning makes the terabytes of data reveal the secrets of an intelligent oilfield, working almost on auto-pilot, with minimum manual intervention. Thus, freeing up resources to do what they must – pump more oil.

About the Author

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Shrivan Kamdar is a Sr. Product Manager at Seven Lakes Technologies and has over a decade of experience in the oil and gas sector dealing with cross-departmental data and its impact across organizations. Prior to Seven Lakes Technologies, Shrivan worked with Exxon Mobil as an Engineer, Project Manager and Risk Strategist. Shrivan is passionate about the intersection of business intelligence, AI and energy. He completed his bachelor's degree in chemical engineering from UCLA in 2005. In 2013, Shrivan graduated from the USC Marshall School of Business with an MBA.