

Journey from Static Routes to Route-less Oilfields with JOYN

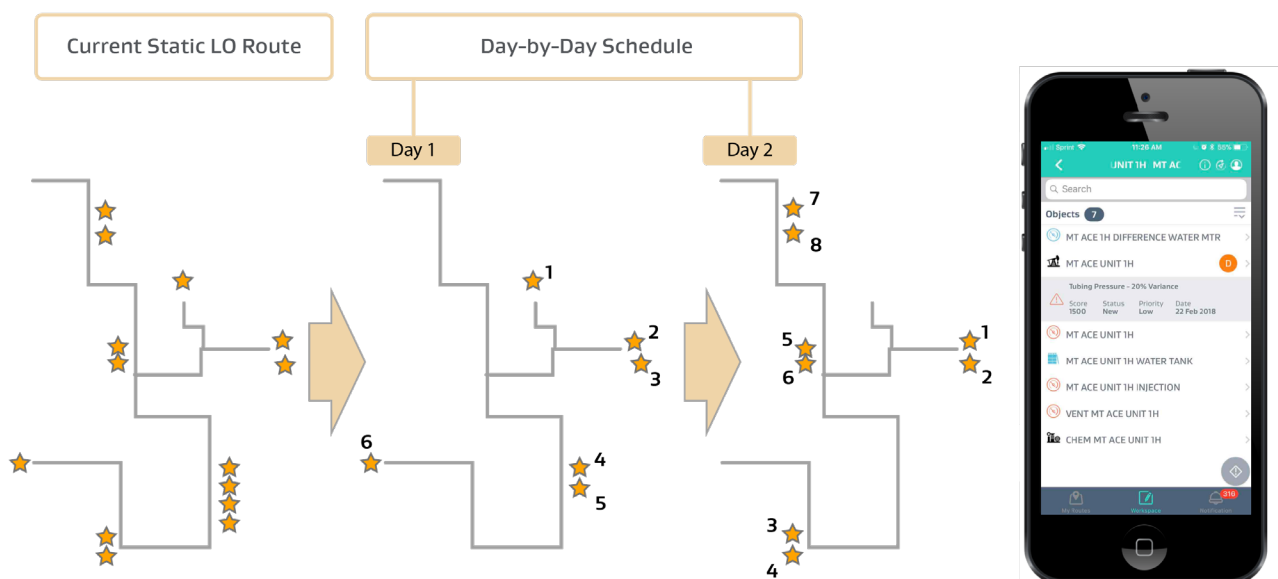
Vast, expansive oilfields. Wells spread out over hundreds of miles. And, lease operators running static routes, driving through each stop to check on each asset, every day. This is how many oilfields operate even today – compromising on operational efficiency, unable to prioritize, losing valuable time.

The high stakes on shale requires you to create optimized fields addressing high value assets on priority. Breaking the convention of static routes, many producers are now optimizing routes to prioritize high producing wells and thus reducing downtime and increasing production.

Route optimization is a key factor in uplifting field efficiency. And, different oilfields choose different approaches to optimize their routes. From stone carved traditional static routes to running route-less oilfields is a journey in technological maturity. The path need not be linear, though. You can leap frog to any stage based on the business context and current need in a specific field.

Risk Metrics Based Well Visitation Frequency with Lease Operator Scheduling

Lease Operator Scheduling in JOYN equips you to schedule well visits based on the production value and location of a particular well or asset. Simply configure visitation frequency and location metrics for each asset. The algorithm optimizes routes to ensure lease operators visit the wells and assets at the assigned frequency with minimized drive time and avoid redundant site visits.



Lease Operator Scheduling Based On Well Visitation Frequency



Assigning Risk Metrics

Well / asset visitation frequency is decided based on predefined risk metrics such as production, asset location, and compliance requirements. For example, a high producing well will have a higher risk score and may have a well visitation frequency of every day where as a low producing well may only require a visit once in fifteen days. Similarly, wells in close proximity to a river or a highway or a public utility may have a higher environmental risk potential, requiring more frequent visits for compliance, even though they may not be high producing wells.

Averting Downtime with Prompt Action

A mid major recently averted potential downtime and saved thousands of dollars by addressing an emergent situation swiftly at a well head. The lease operators, while on a scheduled visit to a well head in the Permian, found some cables of a sensor chewed by rats. As per prior practice the operator would have had to hurry to the next daily static stop and would not have had time for these critical repairs. The operator would have raised a request to schedule a visit by an expensive electrician to replace the cable. And, the issue would have taken days to resolve. With JOYN the lease operator was able to spend extra time saved from avoiding redundant site visits on location splicing back sensor cables This prevented downtime on the well and saved scheduling time for an I&E tech to visit, already managing a backlog.

Dynamic Routing to Drive Meaningful Automation

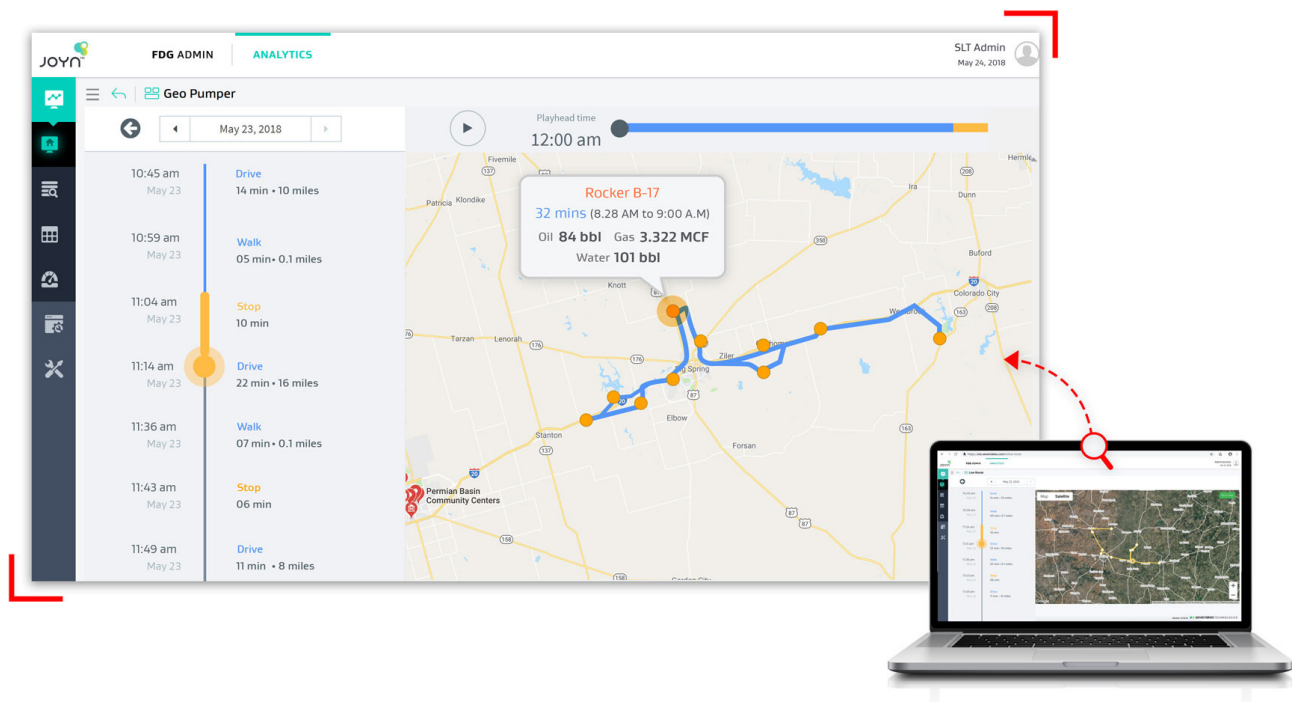
Mobility equips lease operators to visit assets at a defined frequency. However, hundreds of SCADA alerts every minute fall between the cracks for lack of adoption. Dynamic Routing on JOYN integrates SCADA alerts and equips the field to act on emergent situations.

The lease operators no more require an office visit to collect their daily route priorities. Instead they get their field visit sequence on JOYN and follow optimized routes to not just save time but address high priority assets first. Dynamic Routing algorithms in JOYN identify high priority events based on the risk metrics configured by assets, rationalized SCADA alerts and their location to update the sequence of stops for operators on particular routes. The pumpers access updated stop sequences on JOYN on the go to pump by exception.

Every minute of the field workers' time on ground is utilized based on their skills and expertise. Saving drive time means gaining ability to deliver more.

Dynamic Routing Saves 25% Drive Time

At a Permian mid major, earlier the operators would drive for over 4 hours a day and follow a fixed route to check every stop. Dynamic Routing now directs them to the stops they need to prioritize, reducing drive time by over 25%. Drive times have been cut to less than 3 hours, getting over an hour back, every day, to deliver more.



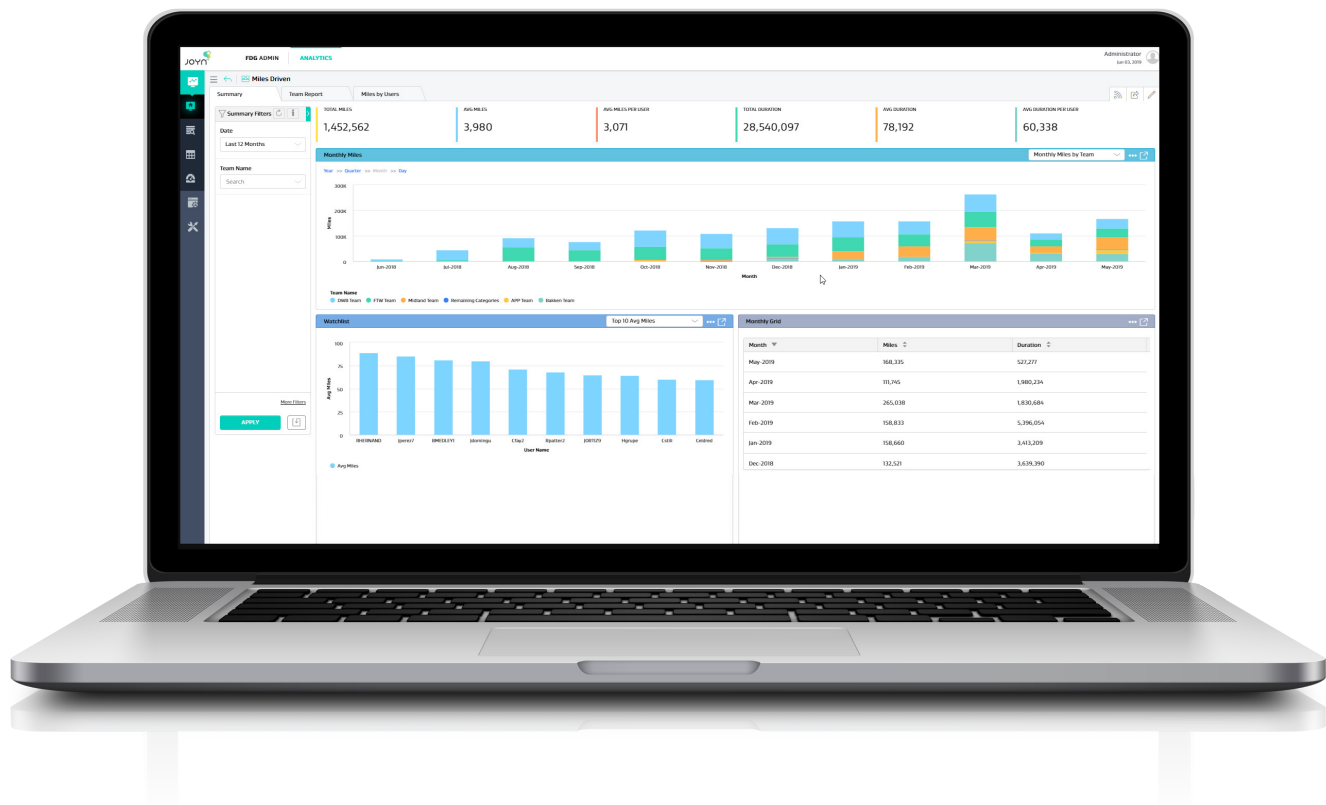
Dynamic Routing and Live Tracking

POV

Live Tracking and Analysis for Prompt Action

Field supervisors track every operator on a satellite map dotted with the assigned sequence of stops with GPS enabled live tracking. The supervisors can track minute details of time spent by operators at each stop, or any deviation in planned routes to flag exceptions and take required action, immediately, removing latency in the system. The analytics layer allows for deeper analyses including miles driven and minute spent on site for each barrel of oil produced.

POV



Miles Driven Dashboard



Route-less Operations for Connected Oilfields

Going beyond Dynamic Routing, the next step is to go route-less. Now, you can Uberize your oilfields for route-less operations and address high value assets on priority with artificial intelligence powered **Routing Engine**, at the heart of JOYN 2 platform.

Developed with over 3 years ongoing R&D effort by a team of experts, the dynamic routing engine leverages leading optimization techniques and frameworks to solve large, variant routing problems extending the Vehicle Routing Problem (VRP) model beyond heuristics.

Now, there is no sequence of stops or routes to run. Every activity in the oilfield is a task, matched to best suited workers based on their proximity to the event, their skills and priority score assigned to the task, automatically. The time gained from mobile and intelligent field operation is spent on delivering more value. Thus, each operator has significantly more time every day to cover more ground.

Pre-scheduling preventive maintenance, pulling resources from different teams without impacting their daily schedule keeps the field proactive. The field is also equipped to respond swiftly to emergent events like oil spills or high value wells going down, by automatically dispatching the right resource with the right skills at the right time.

Optimized Routes for Every Oilfield with JOYN

Operational excellence is the key to improved production without additional cost or resources. Route optimization is the lever to gain time back for every lease operator. Fully connected, route-less oilfields are the ultimate destination. But you can choose your entry point based on your business context and priority. JOYN is your partner of choice at every step of your route optimization journey.