Integrated Operations (IOps) or Digital Oil Field (DOF) is a concept that spans the entire gambit of activities for an Oil & Gas production company. From geological and geospatial data, through drilling and cost allocation to production and back allocations – all these areas are typically involved in an IOps project at some point. The question then is – why do so many companies struggle with the implementation of this type of project?

The answer lies in the nature and ownership of the project. The technology used comes under the remit of the IT group, who will “own” the technology but who are an end user and typically will not understand the purpose or specific usability requirements. The end users have no understanding of the corporate IT requirements and therefore are not well placed to determine architecture, standards, communication protocols and support requirements.

Successful projects are therefore a collaborative activity between groups, working to a plan owned by both the COO and the CIO. The creation of the plan is the hardest part because it needs to encompass the current technology and automation map, determine the “white” space and also look to the future state of the organisation. All this results in workflows that change and dictate different technology. This plan needs to have ‘stage gates’ and review points where the timing, activity, benefits and technology direction are reviewed and, where needed, modified.

This planning activity therefore requires a unique skillset - understanding the domain technology suite, how data flows between groups in an organisation (in both the as-is and will-be scenarios) and an ability to marry this with overall technology plans – operating system obsolescence, new technology advances etc. The skills also need to understand how existing “fit for purpose” components will integrate with new functionality and how this will be adopted by an organisation, realising that no two organisations are the same.
THE BUSINESS CHALLENGES OF DOF

There are many reasons why a company would want to start down the road of a Digital Oil Field implementation. In the current operating environment there are various factors that are paramount to improve performance and metrics which are of major concern. These include;

- Improved assessment – improved strike rate and accurate reserves reporting
- Enhanced recovery – maximum recovery of material in the ground
- Asset utilisation – achieving the highest Overall Equipment Effectiveness
- Data intensiveness – utilising the power of data and automation
- Diminishing outputs – reversing or reducing production decline in mature fields
- High cost of asset hire – resources (material and human) are increasing in cost

All of these factors are concerns and to some extent can be alleviated through the use of technology, the reduction of manual steps and the elimination of non-value added activities.

DOF HIGH LEVEL GOALS

The high level goals of any DOF implementation are simple – they streamline processes and provide salient, timely information to key stakeholders and decision makers within an organisation. They also facilitate a common, in-depth understanding of multiple aspects of the operation which is accessible to all proponents regardless of location and function. This allows the power of an organisation to be utilised to focus on the key areas – removing duplicated effort, improving production and reducing lifting cost.
ARCHITECTING THE DOF DATA PROCESS

The first step of oil production starts with the seismic data and ends up with decommissioning, plugging and well abandonment. In the intervening steps, huge amounts of geological and geophysical data are created, followed by logging data, production data, accounting information, well performance, reservoir simulation through to reserves management, planning and costing data for the final abandonment or divestment process. All of these data classes typically reside in different databases, with different owners and different structures. Combining, contextualizing, synchronizing, extracting the relevant information and then federating the results is a very difficult activity. Complex data in different platforms can be combined to improve the assets and enhance recovery but remains one of the biggest challenges facing an organisation.

Achievements in this area come through the application of consulting, domain knowledge, IT support and a clear eye on the future state – with a high degree of flexibility since plans and reality in the Oil & Gas space rarely remain linked!

BRIDGING DATA CLASSES WITH DOF

With digital system on any operating oil field, there will be a torrent of different data classes being used. This data needs careful orchestration into metrics and information that prompts or drives decisions and action. Given the variety of data types (economic, reserves, molecular breakdowns, planning scenarios, statistical probabilities etc) this requires an agile information management approach that can be achieved with a carefully architected solution. As a business, there is a need for benefit categorisation and stage gates or reviews as and business stakeholders need to demonstrate clear and tangible fiscal benefits to any investment project. Controlling the delivery, achievements and marshalling the data stream delivery is therefore essential to a successful DOF deployment.

DOF FUNCTIONAL DECOMPOSITION DIAGRAM
DOF WITH P2 AND TECHM MAPPING

TECHNOLOGY AT THE HEART OF DOF BENEFITS

As a backbone to a DOF implementation, technology innovations are paramount. Wireless networking, Remote Telemetry Units, 4G telecoms and gigabit Ethernet all play a large part in enabling successful projects. The latency in underlying systems is reducing, meaning that near real-time decisions can be enabled across a global enterprise, bringing the collective knowledge and “intellectual bench strength” of an organisation to bear on solving problems or determining a way forward with an abnormal situation. From a pure production perspective, increased wireless and remote connectivity from the production sites brings the benefit of remote asset monitoring and control, with onshore specialists able to continuously supervise key production processes and metrics to troubleshoot potential problems at an earlier stage and maintain a stable flow of resources. Tech Mahindra has a matured practice for Upstream Exploration and Production; with about a decade’s experience. During this period it has delivered wide range of IT projects to numerous E&P companies, across the globe. In delivering these Domain centric IT solutions and services TechM has garnered immense expertise in the various aspects of Digital Oil Field. This includes, but not limited to Integration, implementation, testing, support and enhancements of various components of DOF.

Tech Mahindra partners with P2 to provide both products and services in the niche space of DOF.

P2 has its roots that stretch back to 1928, P2 is the only upstream technology company providing a comprehensive range of integrated and scalable software solutions to drive production, manage growth and minimize risk for upstream oil and gas operations around the globe.