Curate Technical Case Study

Integration and accessibility of Rock and Fluid data at a Major Operator

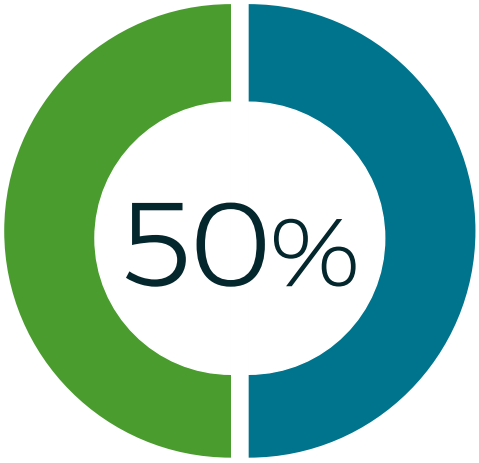
Ikon SCIENCE

In this case study you will:

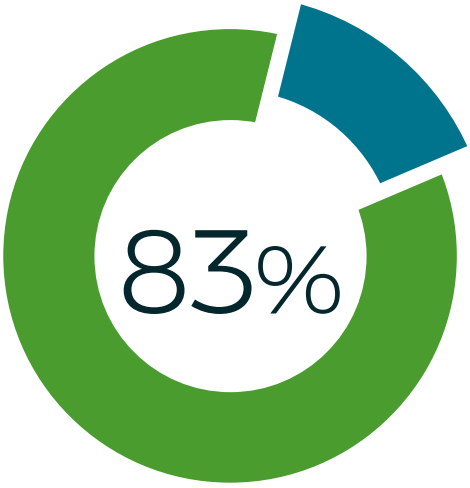
- Discover how the operator leveraged Ikon Science technology to establish a centralized repository for their corporate rock and fluid data.
- Explore the impact of Ikon Science's Curate platform on enhancing accessibility for business units.
- Investigate the efficiency gains achieved through automation and integration technology, streamlining data flow without requiring additional investments in data loading resources.
- Delve into the scoping and design process undertaken by Ikon Science and the client, laying the groundwork for the successful buildout of the solution.
- Uncover how this implementation serves as a robust foundation for the future growth of data management capabilities within the subsurface department of the operator.

Introduction

Subsurface understanding is vital for energy operators seeking to maximize productivity and minimize risk in exploration and exploitation activities. To this end, our industry spends billions each year on data acquisition, seeking to gain additional insights in the geological and subsurface properties which determine reserves and production rates and drive much of our operational decision making.



of operators rank improving data management as a geoscience priority



of geoscientist time spent searching for, location, formatting data and verifying prior to use

But management of this data is often poor. Data is held in multiple silos, forcing users to visit multiple locations to access data which is often of unknown quality and provenance. Data searching and manipulation accounts for some 50% of a geoscientists daily routine. Some data may be lost forever, or may have to be re-purchased from the source vendor in order to be utilized. While our data acquisition methods have accelerated over the past 20 years, many operators have no formal management of subsurface data types and accordingly, long term ROI on data acquisition is at an all-time low

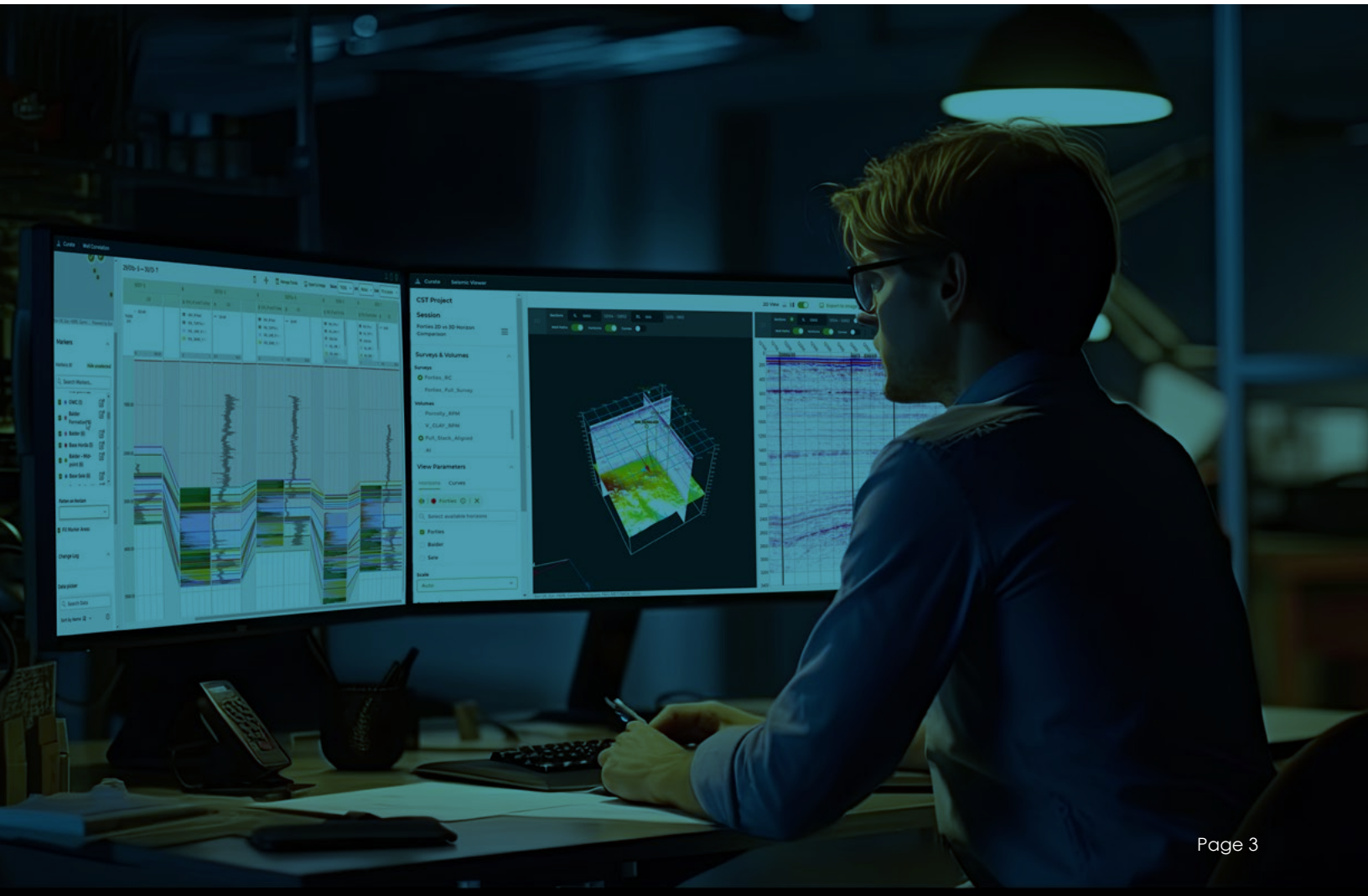
Customer Profile and Goals

A super-major client based in Europe was seeking to build a centralized data management solution for rock and fluid data. This client has invested millions in developing and maintaining a series of sample laboratories which generated cutting edge insights into the geology and fluids of their global assets. In addition, sample data was acquired from partner operators and 3rd party vendors.

Geoscientists in business units had no direct access to this data, with requests made to a small team of data specialists. Considerable lag between request and delivery resulted, and once delivered, further data formatting was required to utilize the data in modelling workflows.

The client sought a solution to:

- Store a variety of advanced rock and fluid measurements without custom development
- Provide integration with a number of commercial and proprietary data sources and applications
- Support both automated and manual data management workflows
- Deliver immediate access for subsurface teams to view, search and export data from a single portal
- Integrate with enterprise architecture and security systems
- Allow for expansion to cover additional data types such as wellbore logs and formation tops



Summary of Ikon Science Technologies Used

Curate Software

Web based interface that provides spatial and geoscience focused visualization tools for data querying and preview. Scalable for enterprise use, compatible with SSO and User Management systems.

Curate DB

SQL or Oracle based database for storing digital data and metadata. Fixed physical schema, overlain by flexible virtual schema to allow configuration for client's individual needs and supported data types.

Curate Filestore

Windows folder based file system which allows for storage of raw documents, images and reports. Files linked to metadata stored in Curate DB for query and display workflows.

Admin Toolkit

Administrative tool for user permission and integration management. Contains data loading, data management and data model setup tools.

File Autoloaders

Automated loading workflow, triggered by drop-box file operations. Allows application of configurable, data-type specific business and data qc rules as part of loading to Curate DB.

GQL Tool

DB querying tool, enables ETL type data integrations from any JDBC or ODBC based DB. Pre-configured for common subsurface applications, additional configuration available for proprietary or new tools.

Curate API

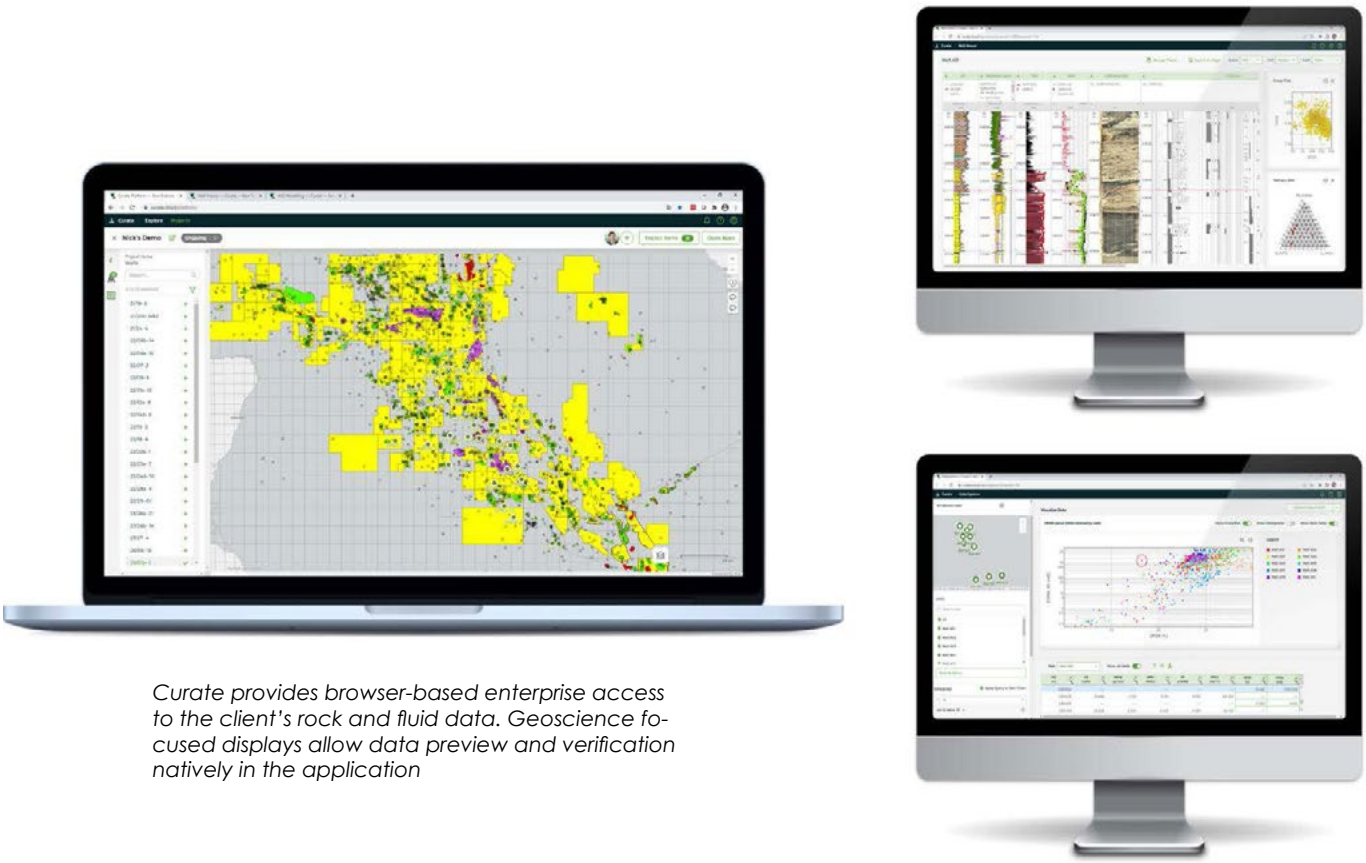
REST based API that allows 3rd party applications and processes to call the Curate DB. Standard or configured implementations available, delivering data in JSON format.

Database Table Views

Exposed views of Curate data and metadata tables. Allows repeatable querying of all data in Curate by 3rd party applications and processes via SQL calls.

Delivery of Ikon Science Solution

To achieve its goals, the client implemented Curate, as a browser-enabled software which allowed users to search, visualize and export data as required. Automated loading and integration tools ensured data was transferred to the Curate DB as it was created, with a series of rules and verifications set to ensure high data quality and consistency.



Curate provides browser-based enterprise access to the client's rock and fluid data. Geoscience focused displays allow data preview and verification natively in the application

Application Details

Curate provided the user community with map-based visualization of the data, ensuring immediate access to a global portfolio of well and sample information. Configurable filters allowed simple searching for data based on type, source, asset, date and other common search terms.

Advanced querying and contextual visualization of the data is provided through the included Data Explorer, Wellbore Viewer and Correlation Tool applications.

These additional tools allow users to develop confidence and understanding of the data without the need for further export or data manipulation.

Integration and Data Management Details

Source data was contained in a number of isolated applications, databases and file formats. Utilizing automated loaders and integration tools, this data was extracted, standardized and loaded into the Curate DB. A number of business rules and data management checks were also applied during this process. A scheduler was set up for ongoing data sources, ensuring continued population into the Curate DB.

Admin Toolkit provides clients with ability to manage security and permissions, as well as providing data QA/QC and standardization workflows

The Admin Toolkit was used by the client to perform additional data management checks, ad-hoc data loading and bulk standardization as required. Configuration and update of the data model was also applied here as required.

Scoping and Implementation

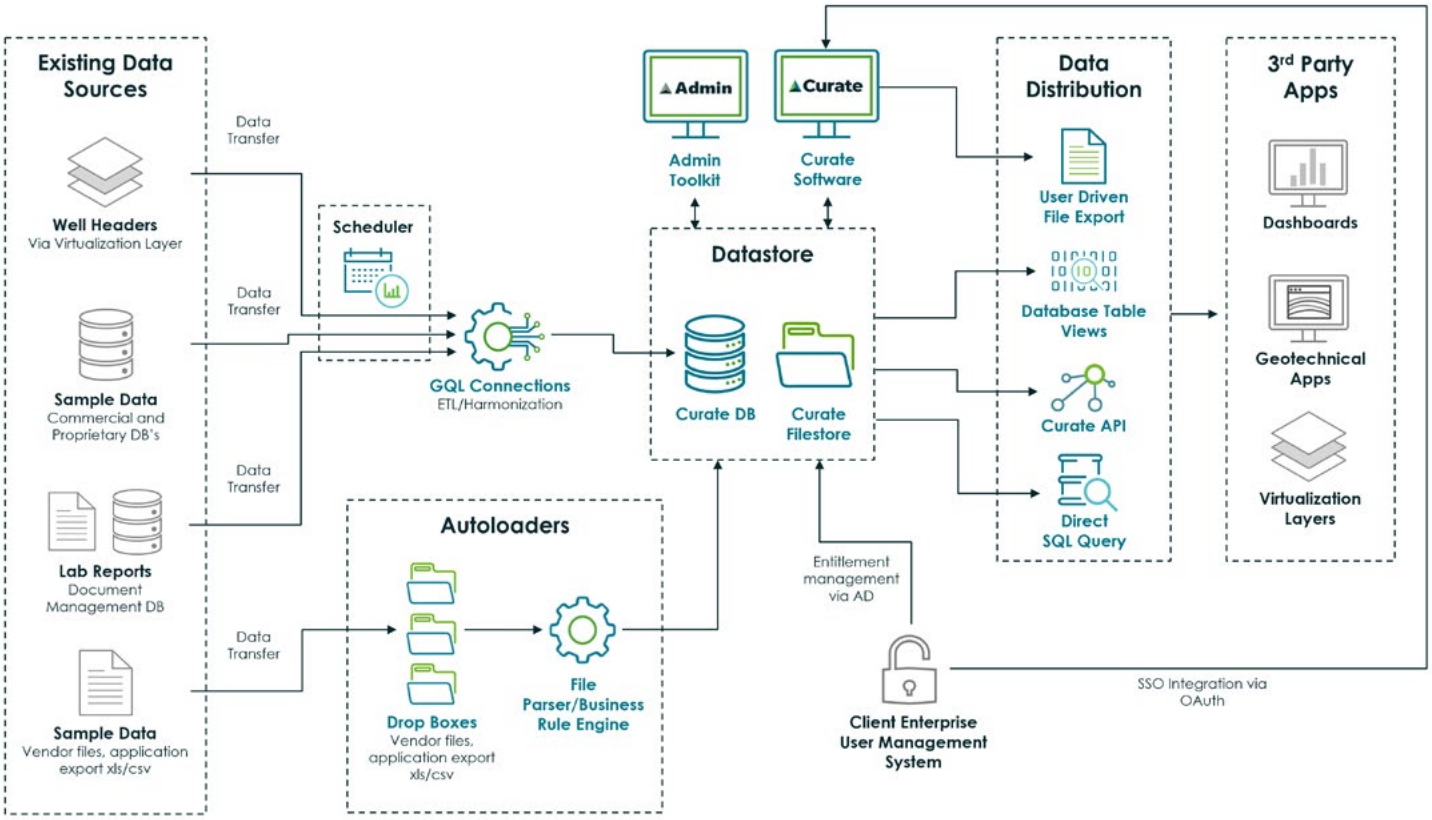
As an enterprise implementation, a large number of stakeholders for the client were involved. An initial scope was delivered to the Ikon Science Data Solutions team and, through collaboration with the client, this was developed into a technical specification. Ikon Science's team of Solution Architects, Technical Developers, Data Experts and Project Managers were engaged to ensure successful delivery.

Agile processes were utilized to ensure that additional learnings in source systems, data formats and user workflows were quickly accommodated to ensure timely delivery of a business-first system.

Technical Implementation Overview

In partnership with the client, Ikon Science delivered an out-of-the-box browser-based interface that provided enterprise access to the rock and fluid data stored in the Curate database. Ikon Science's GQL tool, Autoloaders, and REST based API provided integration capabilities to both ingest and distribute high quality, vetted information.

The client chose to host this system at their on-premises data center to simplify data flow from source laboratories. However, the micro-service architected platform allows simple migration should cloud-first strategy be adopted in future.



Security Integration

The client had an existing enterprise user management system which Curate was integrated with. The system contained complimentary SSO and IdP components.

SSO enablement via OAuth2 reduced the need for client users to enter passwords and login information, improving security and usability.

LDAP was used to integrate with the IdP service provided by the client. The Ikon Science provided Admin Toolkit allowed mapping of user names and groups to data and role permissions.

Scheduled Data Transfer

As laboratories and vendors continued to provide data, continued ingestion from integrated sources was required. A scheduling service was implemented that ensured periodically the source systems would be queried for new or updated records. These records would be validated against the existing contents in the Curate DB and based on business rules treated accordingly. Dependent on the source system, pushes were scheduled either weekly or nightly to occur when there was low network traffic.

Manual file transfer via the Autoloaders was set up to run either as a scheduled process as above, or through a user driven operation. This allowed compilation data from multiple sources prior to commencing the push operation - allowing more efficient loading workflows. At completion of the job, reports were automatically emailed to stakeholders for the data-type, informing how each file was treated and its current location.

Manual Data Management

Automated data management was enacted via the Autoloaders and integration technology. This ensured that all data reached a required baseline prior to be loaded into the Curate DB.

However, additional data QC and updates were necessary to ensure that data was as high quality as possible. The Admin Toolkit provided a GUI for isolation of troublesome data, as well as the tools to clean, standardize and improve data quality for multiple datasets at a single time. Automatically generated metadata recorded the operator, action and timestamp for each modification – providing audit and governance capabilities.

Results and Next Steps

As a result of this implementation, the client now has a singular location for business units to access decades of proprietary rock and fluid data.

Conventional and Special Core, Mud Gas, Geochemical, Oil Fingerprinting, PVT and Source Rock analysis are amongst the data types now housed by the Curate platform.

Browser-based access complimented with rational automatically applied business rules ensures that all assets now have immediate access to high-quality information. This considerably increases the ROI on the acquisition of these complex data types, through provision of cutting-edge insight into subsurface processes that can guide exploration and production business decisions.

Next Steps

The client is investigating further areas where Curate can add visibility and accessibility to its considerable subsurface and geoscientific data stores. Adding new data types such a logs, seismic and interpretative data are all being explored.

In addition, the client is increasing its involvement in the OSDU forum and as such is exploring ways that the open-architecture nature of Ikon Science's Curate may assist as both a visualization and data management component in any future deployment in the OSDU data platform.

For more information on Curate please visit ikonscience.com/curate

Elevate your Subsurface IQ

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