

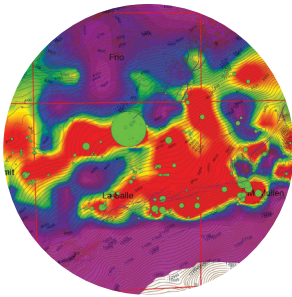


PETRA[®]

Integrated software and delivery tools
to advance your E&P workflow

ihsmarkit.com

Streamline interpretation, optimize play analysis, and make confident decisions using Petra



Geologist

- Identify area of interest
- Integrate well, log and seismic information
- Target drilling and recompletions

Drilling Engineer

- Derive surface and profile plans
- Analyze planned borehole paths
- Perform cost estimates and analysis

Reservoir Engineer

- Identify recompletion & drilling opportunities
- Optimize production and recovery
- Analyze reservoir trends

Completion Engineer

- Model completion performance
- Provide technical specifications and operating instructions
- Optimize completion & workover designs and operations

Production Engineer

- Evaluate separation of produced fluids
- Monitor downhole flow control
- Maximize profitability

Technologist

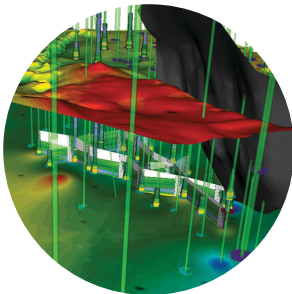
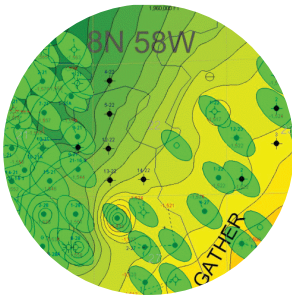
- Load information
- Verify and quality check information
- Collaborate on project development

Petrophysicist

- Understand reservoir properties
- Perform well, core & log analysis
- Build reservoir models
- Evaluate reservoir models

Manager

- Assess strategy
- Manage risk
- Ensure compliance



From exploration to completion, energy critical information and analytical tools you can count on

Petra is a unique solution for data management, manipulation, visualization and integration of geological, geophysical and engineering data. You can quickly visualize results using mapping, cross-sections, seismic interpretations, log plots, cross-plots, production and reservoir analysis and 3D visualization.

Petra also features direct links to the following applications.

- Kingdom™
- AccuMap™
- Energy Web Services (U.S. Well & Production database, International Well database)
- Harmony Enterprise™
- Analytics Explorer
- Well Log Downloader
- GeoSyn™
- Information Hub™
- PowerTools®
- Enerdeq® Browser



Build your Petra project using IHS Markit critical information

Well Data

- Access a database of more than 4.5 million current and historic well records easily via Petra and other applications, including exclusive data not available through other agencies
- Rely on continuously updated information including well header, formation tops, logs run, completions, production tests and more to ensure the highest level of currency IHS Markit Raster & Digital Well Log Data

Raster & Digital Well Log Data

- Access comprehensive log data including over 3.4 million depth-registered raster images and, over 360,000 digital logs
- All logs are indexed to IHS Markit API/Well control system, are continually monitored for API code changes, and perpetually maintained over the life of the well
- Accuracy of digital logs are verified to ensure compliance to LAS specifications via QASA, an ANSI Standard QA process that manually compares IHS Markit digitized log curves to their parent raster log images

Production Data

- Access and integrate production information with Well Data within days of receipt from the source regulatory authorities to ensure the highest level of currency
- Obtain production figures for all fluids, operation hours, injection records, ratios and cumulative values

Directional Surveys

- Use IHS Markit Directional Surveys to determine potential productivity, pressure, permeability and extent of oil or gas reservoirs or formations in open well bores
- Understand the wellbore path from surface to reservoir, particularly for unconventional plays and when using interpretation software such as Petra

Interpreted Formation Tops

- Use to map gross geologic structures within a consistent stratigraphic framework for an entire basin
- Increase your knowledge of depositional environments
- Validate new and existing prospects against an unbiased dataset and in a regional context

PRODFit

- Producing Formations from Interpreted Tops is a new way of assigning a formation to well data by leveraging the IHS Markit Interpreted Tops database
- Maximize efficiency and time savings through enhanced visibility into historical well activity and producing formation details
- Enhanced accuracy of well data through the correction of millions of inconsistencies
- Enhanced completeness with Formation at TD, Producing Formation, 80 Degree Heel Point (HZ Landing Zone), Perforation Intervals, Cored Intervals, Drill Stem Test Intervals, IP Test Intervals, PT Test Intervals, Pressure Tests, Oil-Gas-Water Analysis Tests, Well Tubulars, Mud Weights

Challenge	Solution	Related Tools
How do I effectively and efficiently analyze and manage vast amounts of information and build accurate models?	A direction connection between Petra and IHS Markit information enables you to download multiple sources of the information for immediate use in Petra and other applications. It also ensures that you have the most up-to-date information available. Within Petra, utilize the Map, Log Correlation, Cross Section and 3D Visualization Modules and more to model and analyze your area(s) of interest.	<ul style="list-style-type: none"> – Well & Production Data – Well Log Data – Drill Stem Tests – AccuMap – Enerdeq Browser – Kingdom – Analytics Explorer
How can I develop a short list of “hot” areas and develop prospects and operating strategies?	Identify top producing areas and production thresholds in your area of interest with Well and Production information from IHS Markit. Then, use Petra Decline Analysis functionality and the new Directional Well Module to study stimulation strategies.	<ul style="list-style-type: none"> – FieldDIRECT® – PowerTools – Kingdom – Analytics Explorer
How can I plan for the future production and depletion of my reservoirs?	Analyze trends, devise depletion strategies and manage reservoirs using Petra Group Production Plot and Decline Curve Analysis modules. Calculate hydrocarbon recoveries based on established industry models using Petra Advanced Volumetrics module.	<ul style="list-style-type: none"> – FieldDIRECT – PowerTools – Well & Production Data – Well Log Data – Interpreted Formation Tops – Harmony Enterprise
How do I quickly evaluate a prospect?	Estimate future declines, determine reservoir pressure, and map ultimate recoverable gas, cumulative gas and gas decline rates using Petra Decline Analysis, Volumetrics and Map modules. Create a template for wells in an evaluation area that share common analysis needs, speeding up the evaluation process for multiple leases.	<ul style="list-style-type: none"> – PowerTools – Well & Production Data – AccuMap – Enerdeq Browser – Kingdom
I need to benchmark production for tight gas sand reservoirs and see what kinds of treatment plans have enhanced production.	Characterize production performance of key reservoirs as benchmarks. Evaluate specific well performance after treatment types.	<ul style="list-style-type: none"> – PowerTools – Well & Production Data

Petra Modules

Petra 3D Visualization Module

Display geological information in 3D for analysis, well planning and presentation.

Petra 3D Visualization Module is designed to give geologists, engineers, technologists and geophysicists the ability to produce a complete three dimensional view of their Petra projects.

Petra Advanced Volumetrics Module

Quickly perform volumetric and fluid recovery calculations for both oil and gas reservoirs.

Petra Advanced Volumetrics Module provides you with both deterministic and probabilistic methods to calculate hydrocarbon recoveries based on well-established industry correlations and models.

With Petra, you can quickly perform volumetric computations and calculate recovery efficiencies using deterministic and probabilistic models. Deterministic models are based on average reservoir and fluid properties, while probabilistic reserves are calculated using Monte Carlo simulation, which outputs statistical reports and probability graphs based on various distributions of reservoir parameters.

Petra Cross Section Module

Display and analyze your data graphically.

Petra integrated Cross Section Module provides the base for producing easily customizable cross section displays, in addition to rapid editing of data and production of stunning graphical outputs.

Petra Directional Well Module

Plan, Analyze and Display Horizontal & Directional Wells.

Petra Directional Well Module provides a interface to improve your horizontal and directional drilling workflows. With Petra, you can:

- Enhance gridded surfaces with repeated tops along horizontal wellbores
- Quickly plan wells and load drilling data
- Analyze horizontal well performance and post results
- and much more

Petra Log Correlation Module

Pick tops across new areas with unprecedented speed.

Petra Log Correlation Module is designed to increase the speed and ease with which you pick tops across a basin or play.

Petra Map Module

Display and analyze your data graphically.

Petra Map Module provides the base for producing easily customizable map displays and allows you to quickly edit data and create cross sections. With Petra, you can easily load, edit and display cartographic data, including grid and culture information, to assist in reservoir analysis and location picking.

Petra Production Group Plot Module

Display and analyze historical and average production data for any set of wells.

Petra Production Group Plot Module allows you to analyze trends, devise depletion strategies and manage reservoirs. Its simple interface makes it easy to display monthly production data for a set of wells, including summing, averaging, or time-normalizing production data.

Petra Sidekick

Petra Sidekick is an external tool that provides users with a rapid and intuitive way to access their Petra project, allowing users to analyze project data in a multi-well view, import and export data into a Petra project, and perform various database maintenance functions.

- Multi-well or single-well data view
- Show well statistics by scanning wells
- Data supported includes project, well, zone, tops, raster, grid, overlay and table data
- Maintenance tools for your Petra project include global data delete, and zone, production, raster log, and digital log maintenance
- Import data through general ASCII files; batch import LAS digital log files and IHS Markit raster log LIC files; import IHS Markit digital and raster logs through Direct Connect
- Export data through a tabular ASCII file

AccuMap

AccuMap provides desktop access to numerous up-to-date databases, including land, well, pressure, production, pipelines, core, reserves and logs for the Western Canadian Sedimentary Basin and Frontier areas, as well as Montana, North Dakota and Wyoming. Information from AccuMap can be exported directly into Petra to perform in-depth analysis of well-centric data. (Canada & U.S.)

Enhance your integrated decision support tools

Direct Connect

Direct Connect enables you to seamlessly connect to and automatically populate or update your projects with our information, providing you with the most current Information in your specified area of interest. Information currently available via Direct Connect includes:

- Well and Production Data
- Directional Surveys
- Digital and Raster Well Logs
- Grid and Culture Data

Kingdom

Kingdom is an enterprise level, geoscience interpretation software solution that allows geoscientists to make more accurate decisions on where to drill for oil and gas. Kingdom has an uncompromised level of integration with additional Kingdom modules for geological capabilities, microseismic data, advanced attribute generation, AVO analysis, 3-dimensional interpretation workspace. Its scalable, multi-user database allows the entire asset team to work on the largest data sets and accomplish their work quickly and collaboratively.

GeoSyn

Powerful, cost effective and easy-to-use, GeoSyn is a synthetic generation, cross-plotting, AVO analysis and 2D modeling package designed for geoscientists. Quickly move from information access and viewing, to analysis, to exporting synthetics and 2D models into Petra. GeoSyn enables you to test multiple scenarios to achieve the best results, and continues to incorporate important new functionality for geophysicists including cross-plotting and enhanced cross sections designed specifically for geologist.

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Enerdeq Browser

IHS Markit Enerdeq Browser enables you to quickly access the information you need for any E&P specialty. In just a few minutes you can map, query, browse, and export the most current U.S. data. Petra features a direct link to Enerdeq Browser, enabling you to stream-line workflows, have the most current data required and make business decisions faster. (U.S.)

Well Log Downloader

Well Log Downloader is a bulk delivery tool designed to improve efficiency by delivering subscription raster logs, XML calibration files and/or digital LAS in large or small quantities with minimal end user intervention. Customers with a Well Data and/or Log Data subscription will receive access to Well Log Downloader at no additional charge.

Harmony Enterprise

Harmony Enterprise is a comprehensive engineering application for analyzing oil and gas well performance and evaluating reserves. Access a full suite of reservoir and production engineering tools in one interface. Create common corporate workflows that harness your organization's technical expertise and share interpretations to determine the best asset development strategies.

PowerTools

PowerTools is a powerful, cost effective and easy-to-use analytical tool for evaluating reserves and economics. Evaluate lease and well production performance with decline curve analysis capabilities. PowerTools also includes multiple lease and well displays, and simultaneous display of multiple forecasts. Add volumetrics calculations and pressure analysis to your evaluation to enhance your reserves interpretation and provide more complete results. PowerTools is linked directly to Petra, meaning you can create or add projects directly from a Petra database into PowerTools and export multiple PowerTools results to zone table cases in Petra. (U.S.)

FieldDIRECT

FieldDIRECT is a field-to-office service that captures daily field production information and stores it in a secure server for you and your team to analyze immediately, allowing you to gain insights into trends and identify and remedy production slowdowns. FieldDIRECT provides graphs, pivot tables, variance reports, monthly and daily allocated production reports at readings and pressures. FieldDIRECT has a direct connection to Petra, allowing geologists, engineers and business and operations manager to conduct historical trending, analyze ROI on workovers and perform reservoir analysis. (U.S.)

*Canadian Data Only

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About IHS Markit

IHS Markit (NYSE: INFO) is a world leader in critical information, analytics and expertise to forge solutions for the major industries and markets that drive economies worldwide. The company delivers next-generation information, analytics and solutions to customers in business, finance and government, improving their operational efficiency and providing deep insights that lead to well-informed, confident decisions. IHS Markit has more than 50,000 business and government customers, including 80 percent of the Fortune Global 500 and the world's leading financial institutions. Headquartered in London, IHS Markit is committed to sustainable, profitable growth.