

Expediting Lab Data with Field-to-Lab Workflows: Lab Express & Digital SCAL



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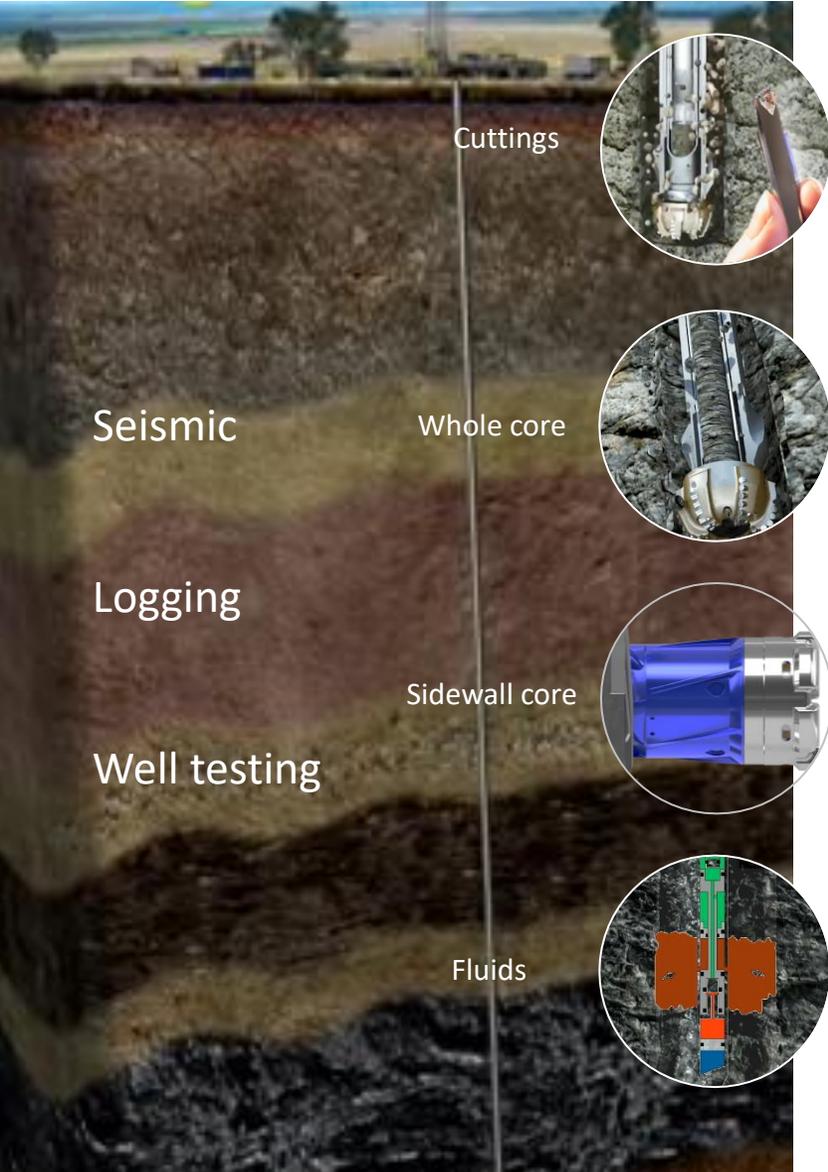
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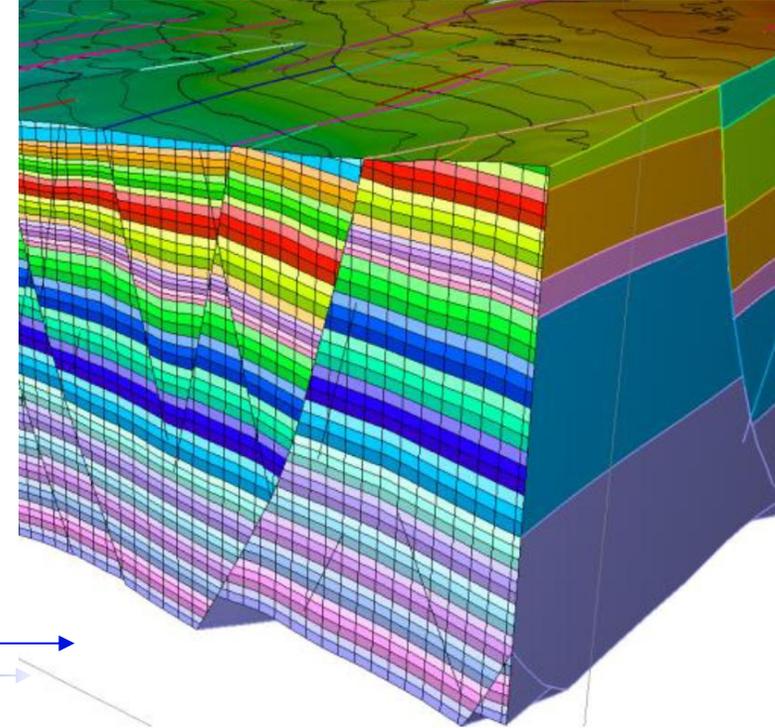
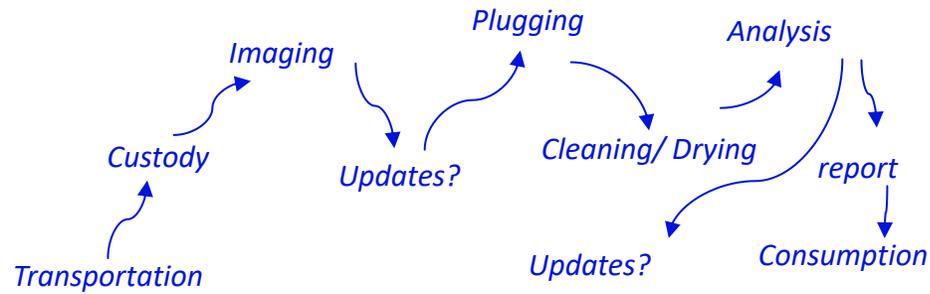
Today's journey



→ 2 to 3 months

Porosity, permeability?

Mineralogy, Rock typing?

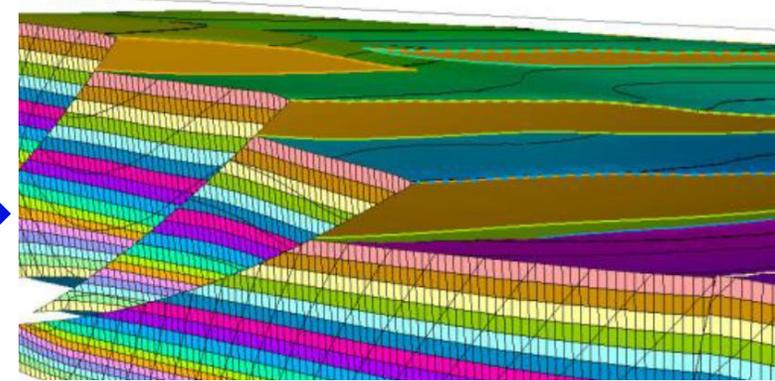


Water flooding?

Cost-effective recovery for better asset's returns?



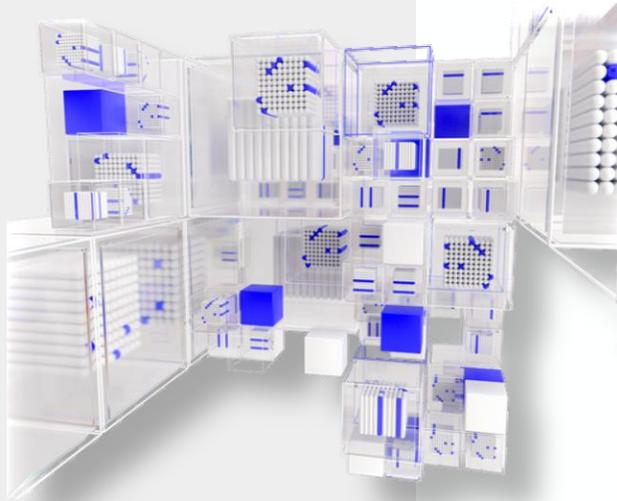
→ 18 to 24 months



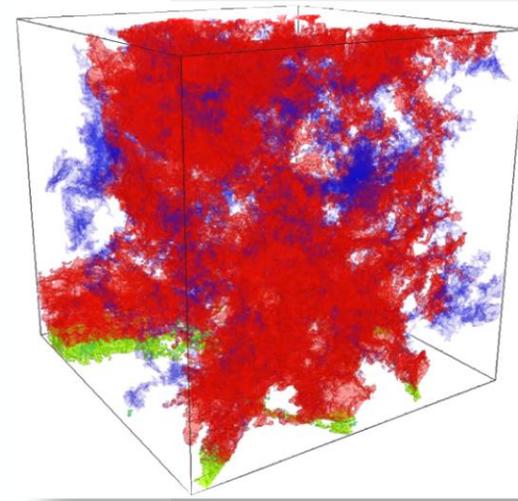
Expediting Lab Data is needed...



Lab Express



Digital Core Analysis



Fluids



Current Lab Landscape



Lab Express Landscape



The Solution



Modular

Customized based on
expected sample type

Field to Model

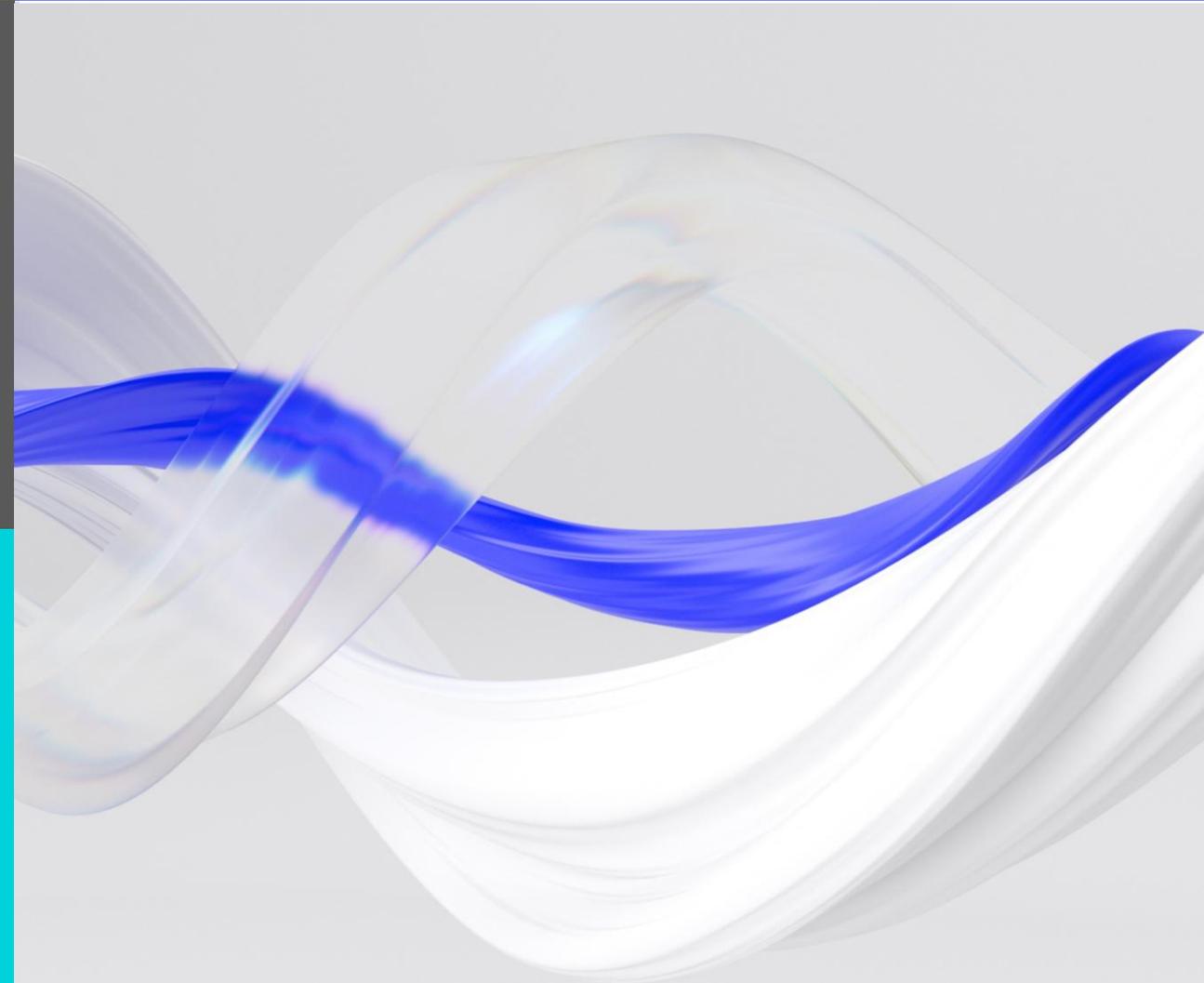
Ready-to-digest
deliverables

Connected & Intelligent

Linked to SLB Systems,
connected to Domain
network

Accredited & Validated

Following EPA/ ISO/ AER
regulations

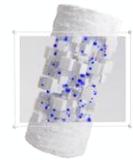




Lab Accuracy, anywhere.

- Waxing Side Wall Cores and Preparing
- Scratch Testing
- White Light and UV Imaging
- Lithology Description
- Portable XRF, XRF for Mineralogy
- UR Desorption Gas Analysis

Ensure Samples Arrive Pristine with Early Inputs from Rock Type and Strength



Mineralogy



Core preparation



Basic Rock Properties



Production
Facilities



New wells

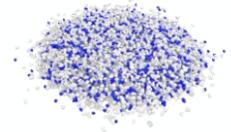


Legacy Storage

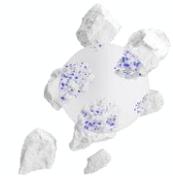
Lab Accuracy, anywhere.

- Restoration and Transfer samplers
- Combined with our Onsite Sampling
- Water Cut, API, Salinity
- Viscosity by EMV
- GOR and Full Composition (C36+)
- Major Ions for Scale Models

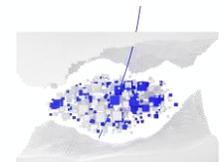
**Data Integrated for Logs Calibration Onsite
EOR Fluids screening**



Special Gas Components



Water chemistry

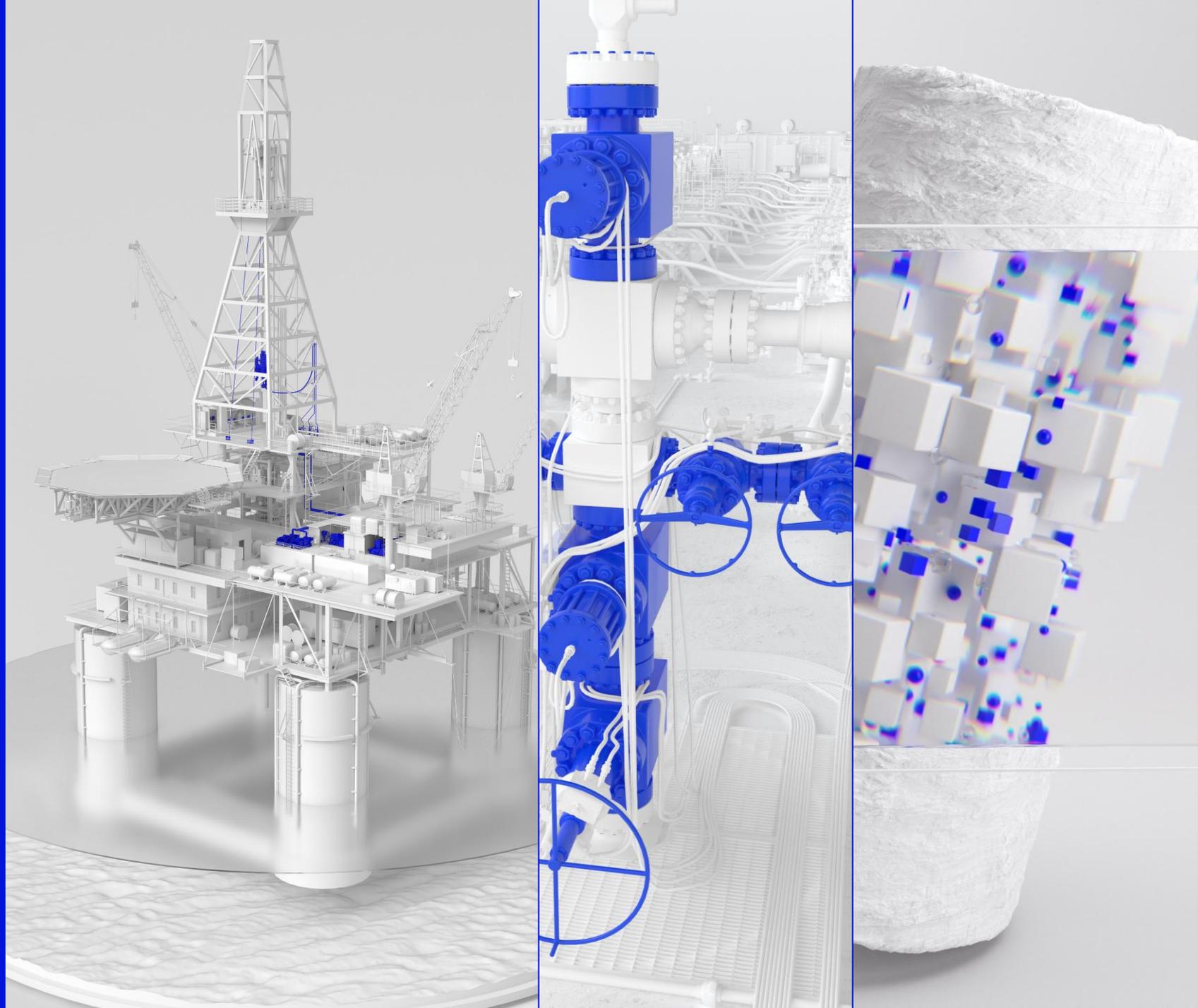


EoS PVT Modeling

What's it for?

- Rig-time decisions for E&A
- Production, Surveillance
- CCS Storage & MMV

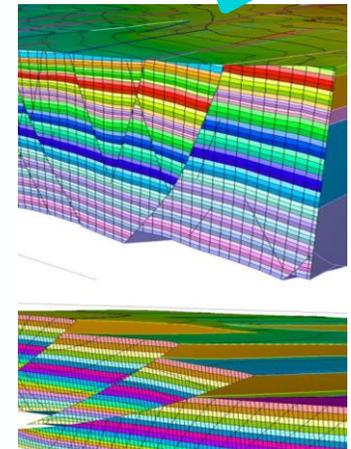
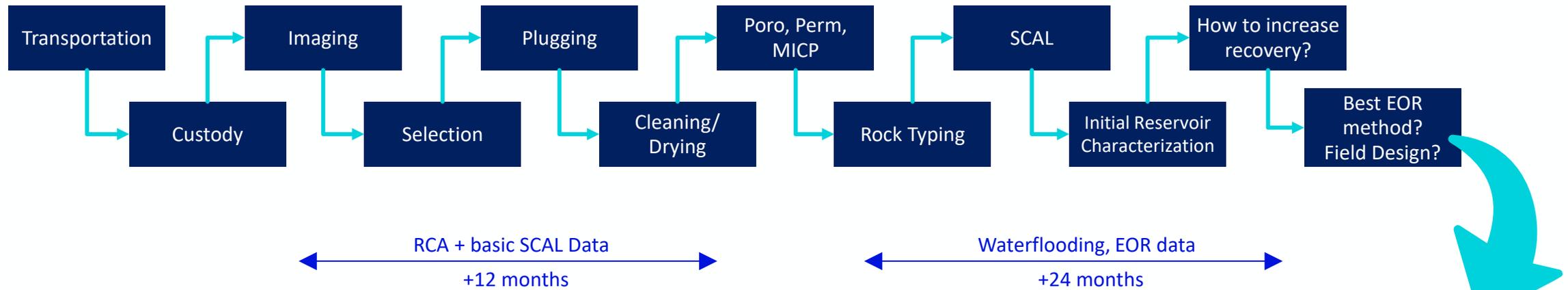
But not limited to...



Digital Core Analysis



Core Analysis is often a painful journey...





SCAL

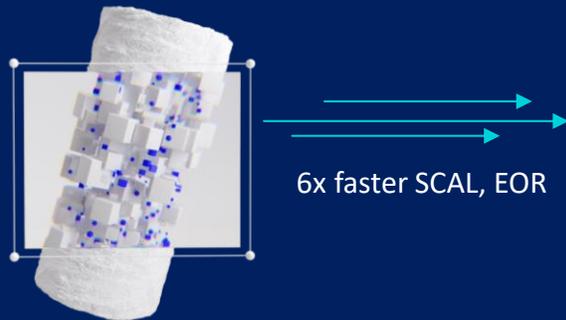
25%+

Feasible only by
digital
measurements

... but Digital Rock Analysis can change that!

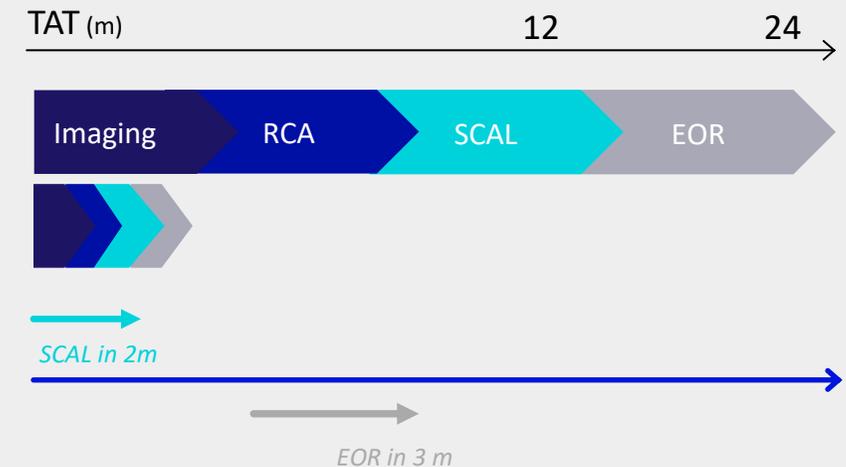


Digital rock analysis

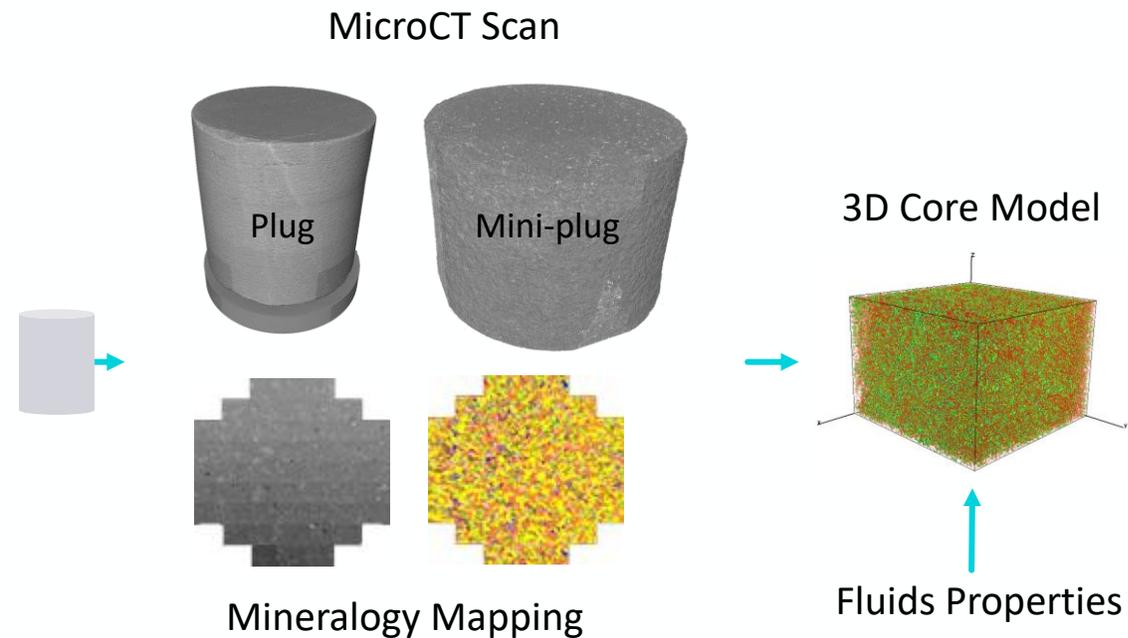


- Digital Twin for future needs
- Non-destructive, no large core or fluids volumes
- Tight, ultratight, unconsolidated
- Sensitivity Analysis for upscaling
- Complementing Physical program
- Whole core/ SWC, internal/ external imaging

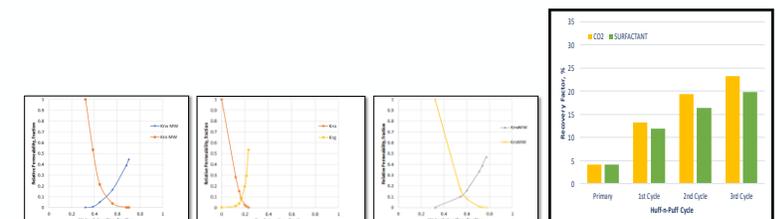
3 x Faster EOR



How does it work?



“Once a rock model is built, it can be used to run sensitivity analysis to see what parameters are most important, and to run simulations of different production scenarios which are not easy, if not entirely impossible, to do on physical rock samples.” — Client’s EOR Advisor



Optimized Recovery Design

Extensively Validated Against Physical Lab



SPE-212617-MS

Rigorous Digital Rock Technology Validation through Cross-Sector Collaboration

- Blind test comparison of relative permeability
- Coarse and fine-grained sandstone, carbonates



SPE-198610-MS

Digital Rock Technology Accelerates Carbonate Rock Laboratory Analysis

- Relative permeability for history matching, water breakthrough
- Recoverable reserves estimation



SPE-196695-MS

Advanced EOR Process Upscaling Using Multi-Scale Digital Verification Technology and FDP Application

- Surfactant screening
- Upscaling bridging core & field - fast-track FDP

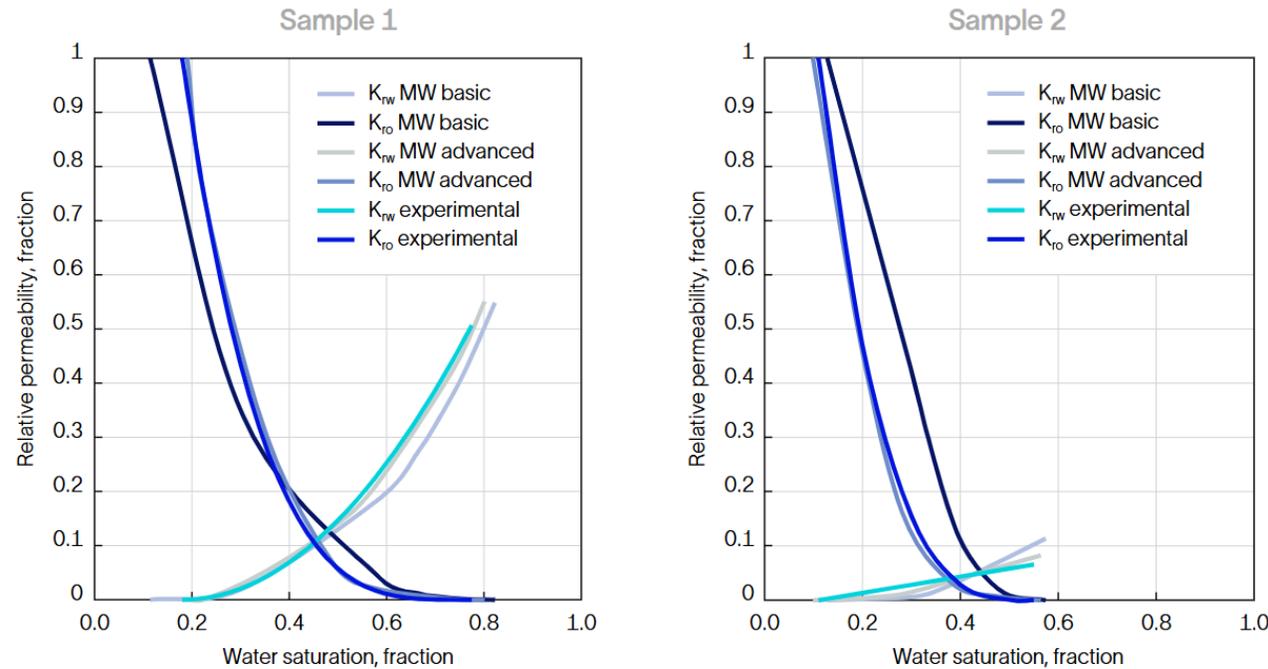


SPE-195872-MS

DSCAL EOR for weakly consolidated sandstones

- Sampling & Analysis, data despite material
- Nov-24: New SPE SureRock+RockID+DSCAL

Relative permeability vs. water saturation



Relative permeability modeling results for two of the samples studied. Resulting curves were normalized with effective oil permeability (K_{o}) at S_{wi} and obtained using both basic and advanced digital rock models. Experimental lab data is shown on each chart for comparison. (In the chart, K_{rw} = relative water permeability and K_{ro} = relative oil permeability.)

“SLB Digital rock technology was proven to be a reliable technology for all studied rocks providing accuracy levels that are within the range of uncertainty of repeated laboratory test results on same core.”

Thank you!

