

# IVAAP

Enterprise Subsurface Data  
Visualization & Collaboration  
Platform on Azure

November 2020



Confidential

# IVAAP Powerful Visualization Platform Can:



- > Search
- > View Data
- > Select Data
- > Launch ML
- > Visualize Results

from

**OSDU**<sup>TM</sup>

and more ...

## Data Visualization & Collaboration

- Discover all subsurface data (well, schematics, seismic)
- Publish / share dashboards
- Map-based search
- View in 2D/3D
- Analyze & QC

## Data Integration

- OSDU, PPDM, ProSource,
- DecisionSpace, MongoDB, WITSML, RESQML
- Cloud Storage (AWS, Azure, GCP)
- Integration with Analytics & ML Workflows

## Platform Extensibility

- Back-end & client SDK
- Scalable micro-services
- Domain API
- Powerful widgets
- Enterprise Architecture designed for high-availability and scalability

# IVAAP: Enterprise Data Visualization Ecosystem



**CLIENT MICROSERVICES**

- MACHINE LEARNING
- ANALYTICS
- ARTIFICIAL INTELLIGENCE

**CLIENT DATA SOURCES**

OSDU

WITSML Server

Databases (PPDM, Prosource, OpenWorks, WellView, ProdView, SQL, MongoDB)

Files (SEG-Y, VDS, LAS, DLIS, etc.)

Other Source, Real-Time Data (e.g. OSISoft PI)

Cloud Service Providers (CSP)

**IVAAP CLIENT**

- USER INTERFACE
- MOBILE-RESPONSIVE (HTML5)
- DOMAIN VISUALIZATION

**DATA DOMAIN API**

**MESSAGING API**

**RESOURCE API**

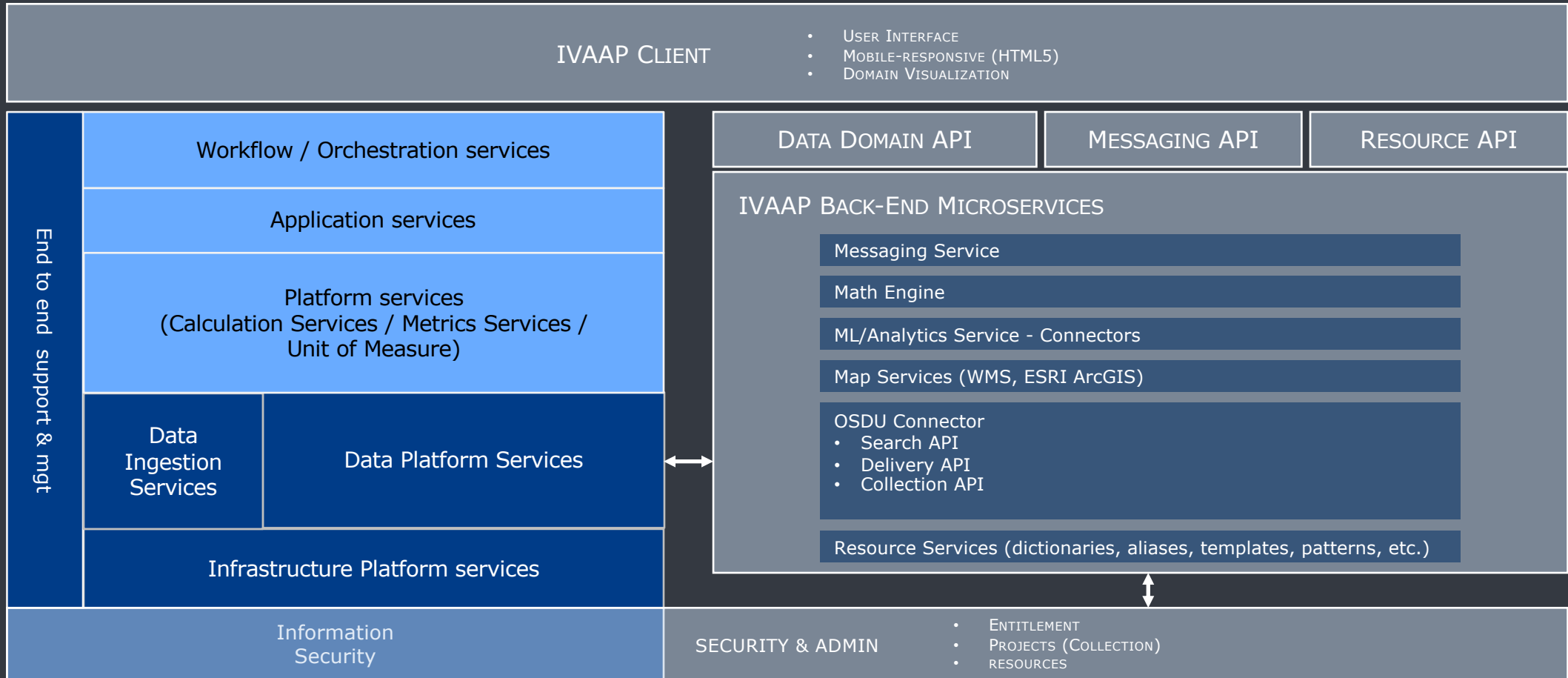
**BACK-END MICROSERVICES**

- Data Services - Connectors
- Real-time Services
- Messaging Service
- Math Engine
- CRS Services
- ML/Analytics Service - Connectors
- Map Services (WMS, ESRI ArcGIS)
- Back-end SDK
- Resource Services (dictionaries, aliases, templates, patterns, etc.)

**SECURITY & ADMIN**

- OAUTH2 (AZURE ACTIVE DIRECTORY AWS COGNITO)
- OPENID, OPENID CONNECT
- SAML (MICROSOFT ACTIVE DIRECTORY), KERBEROS
- ENTITLEMENT
- PROJECTS
- RESOURCES

# OSDU IVAAP Integration Deployment Architecture



- IVAAP – Enterprise Subsurface Data Visualization Platform
- Commodity, in OSDU Standards scope
- Proprietary, out of OSDU Standards scope

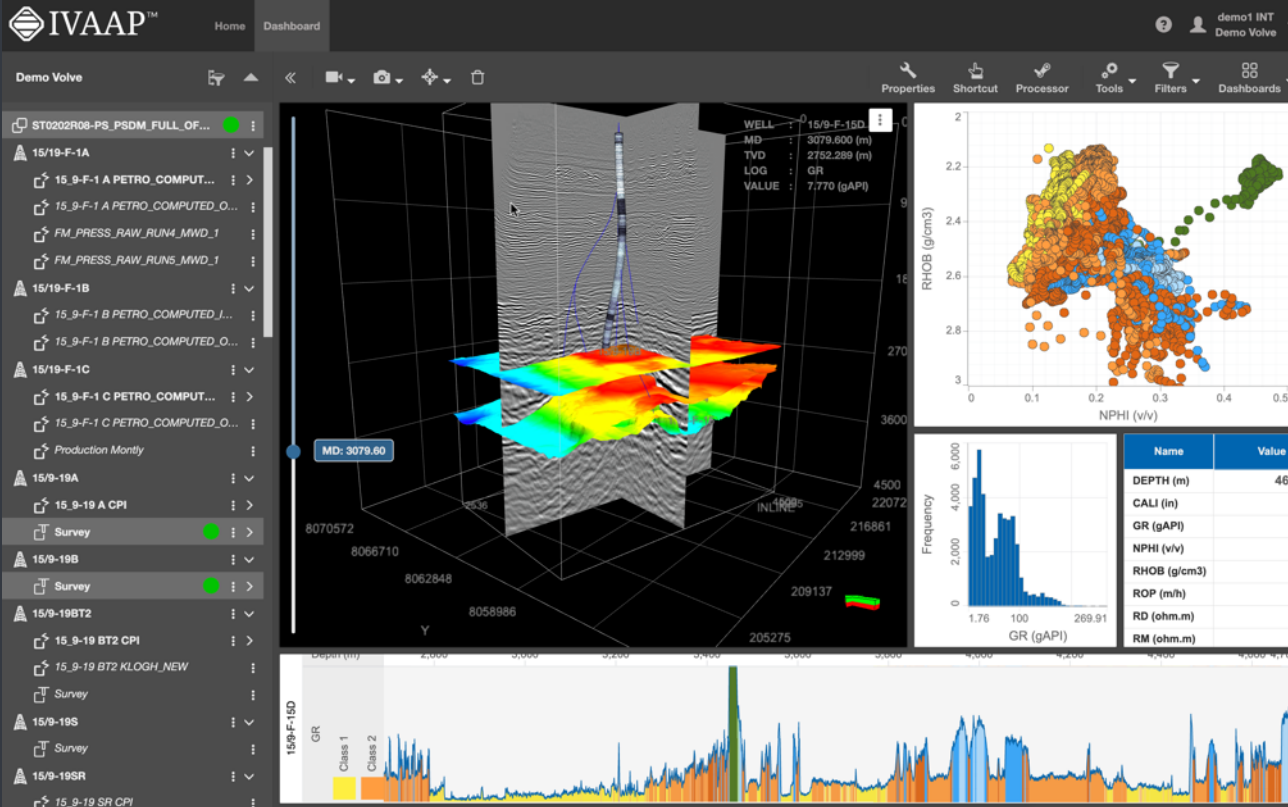


# Implementation examples

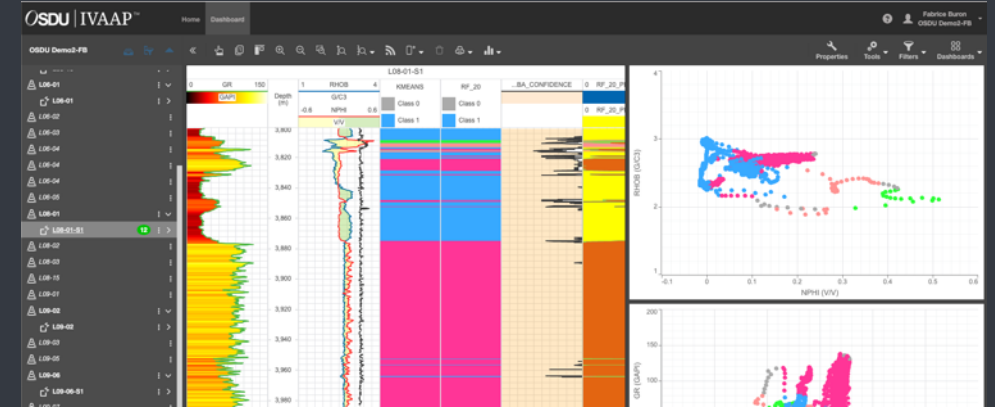
# Subsurface Exploration, Collaboration



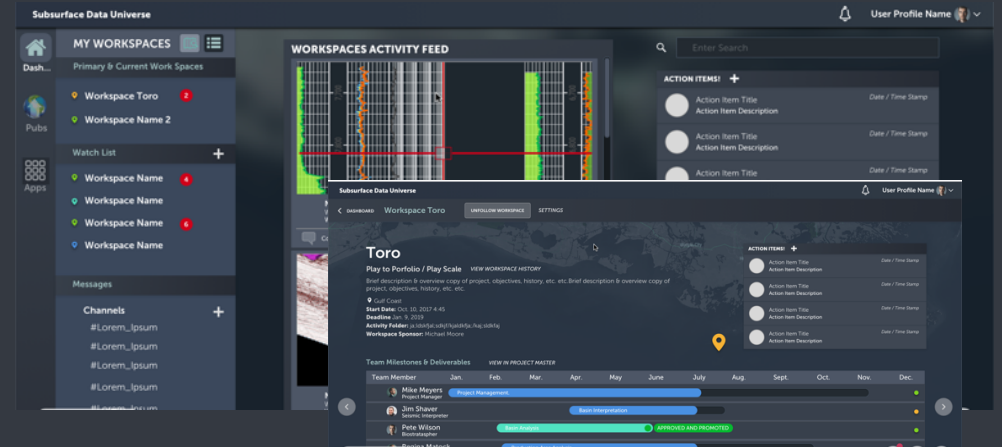
Co-Visualization of trajectories, wells, seismic, surface



Exploration workspace



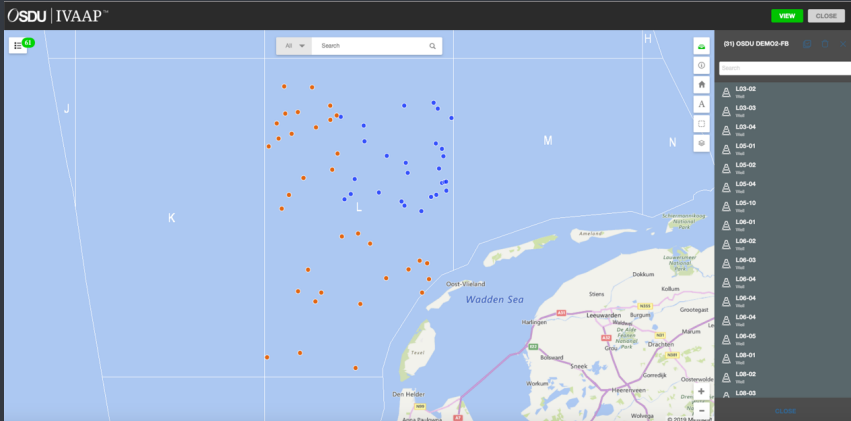
Subsurface workspace



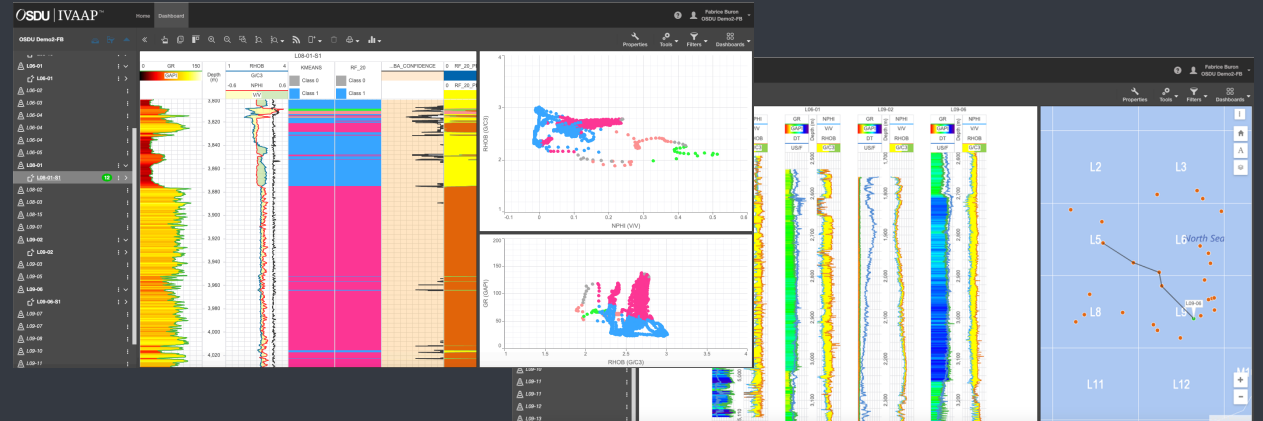
# Correlation, Cross section and Machine Learning



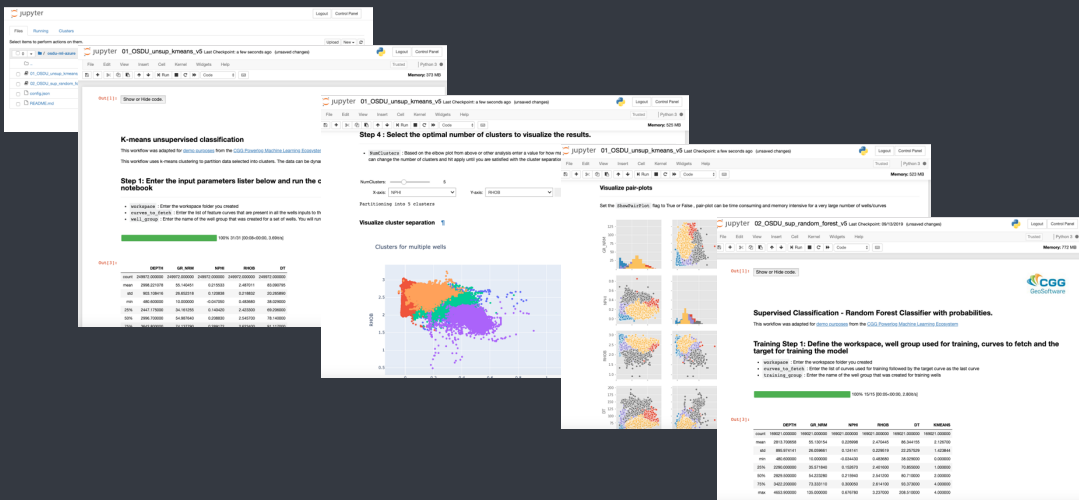
Map-based subsurface search & data selection



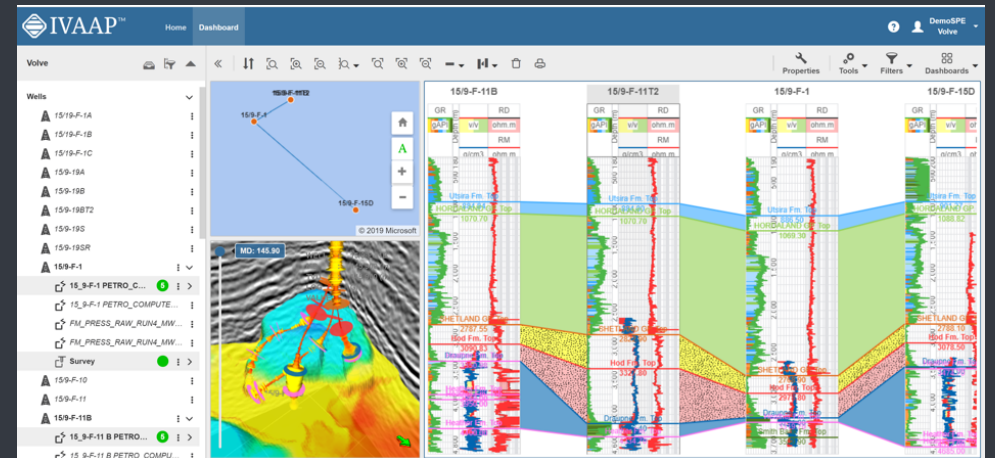
Visualization of results  
(facies auto classification and calculated by ML)



Integration with any ML, algorithm or processing  
(e.g. Jupyter notebook, SageMaker)



Interact & Visualize Well correlation and 3D trajectories

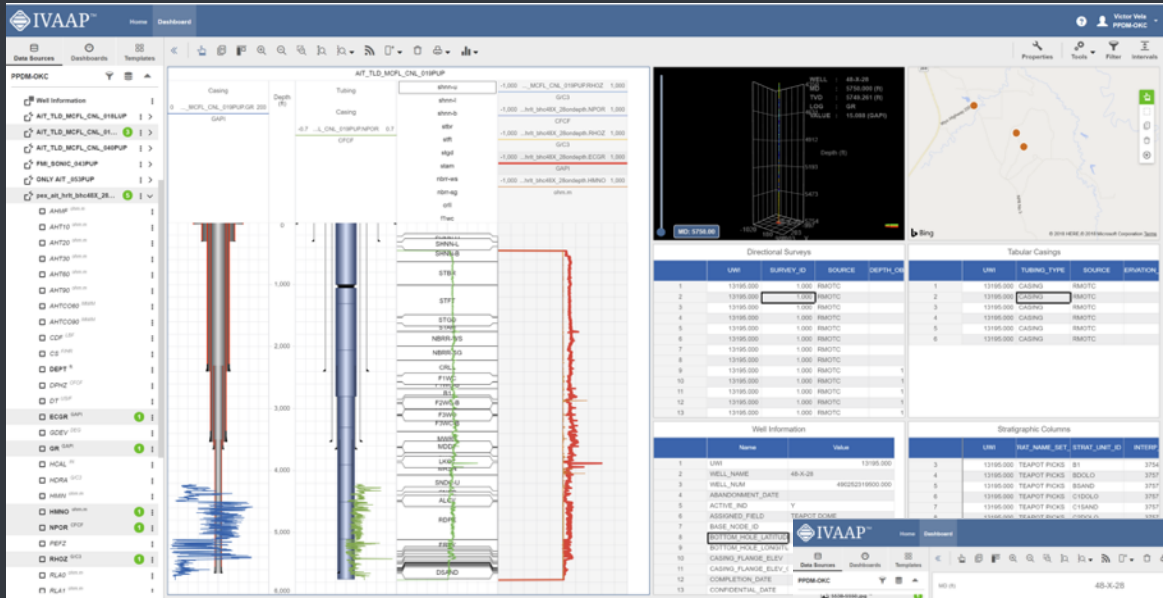




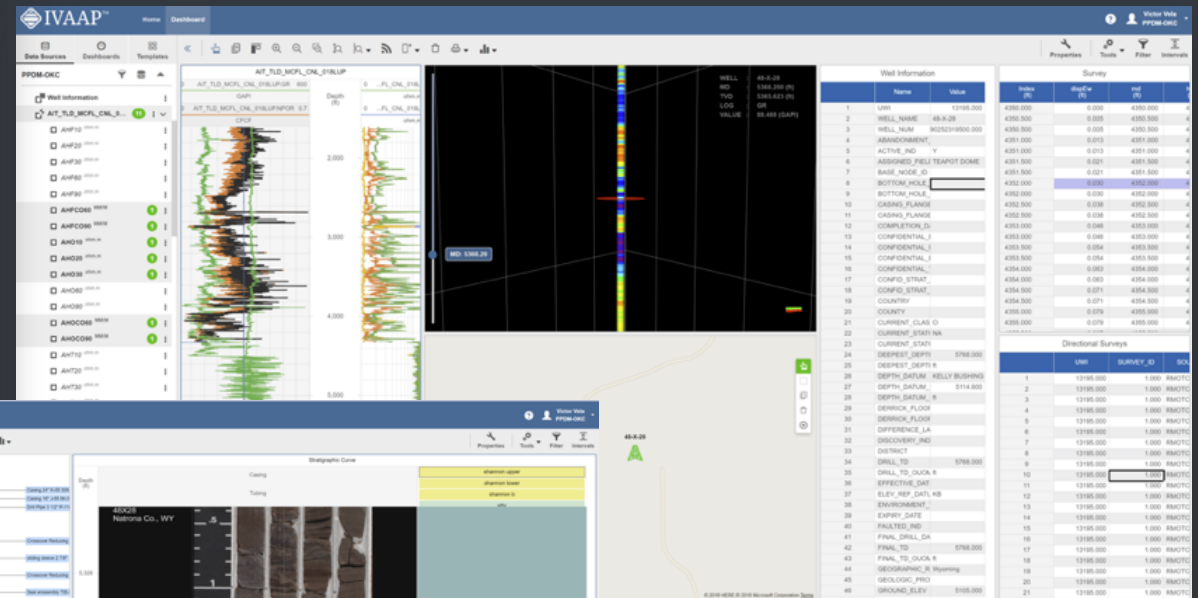
# Data Analysis, Petrophysical Visualizations



Schematics display of PPDM data

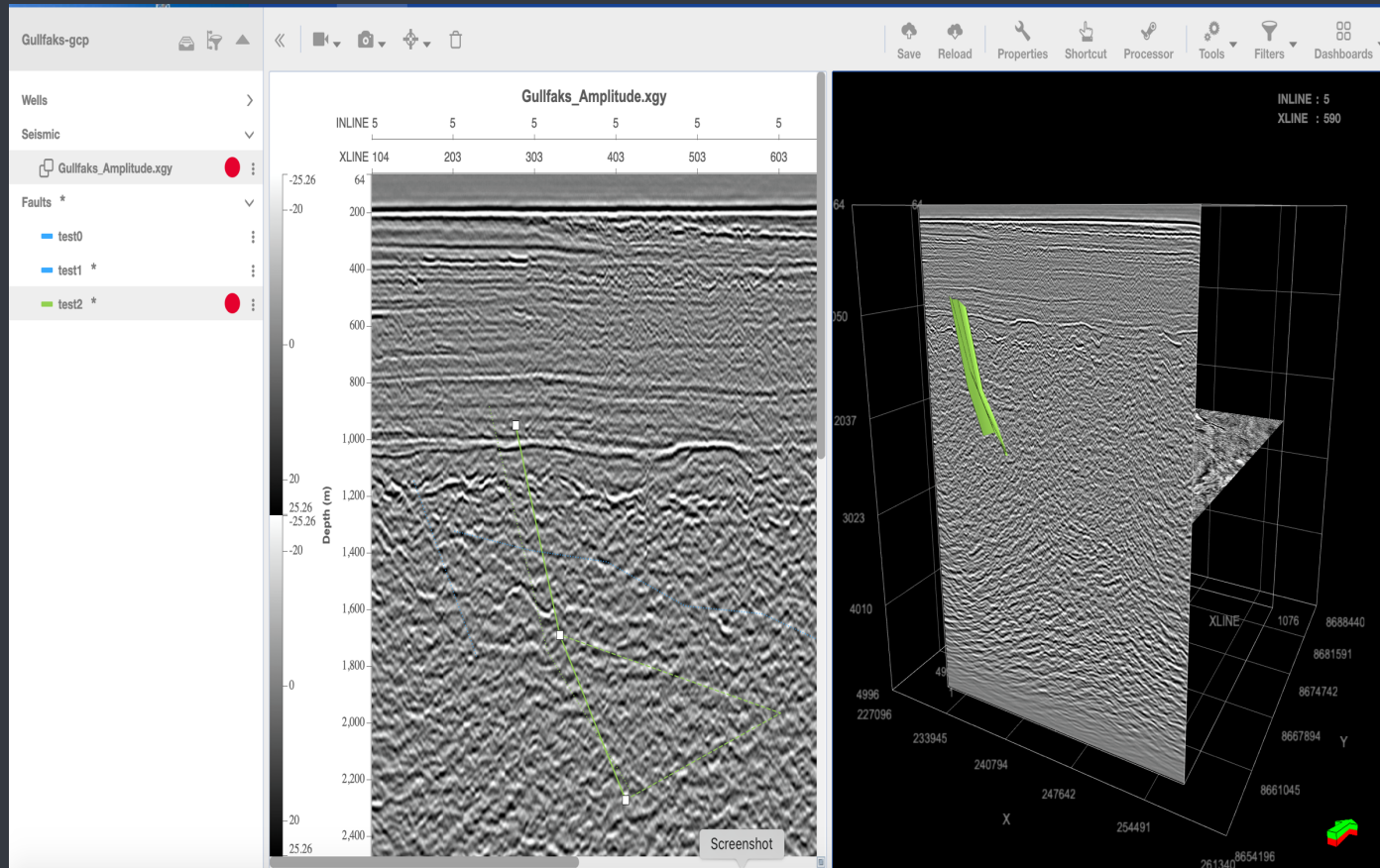


Implementation of data QC business rules



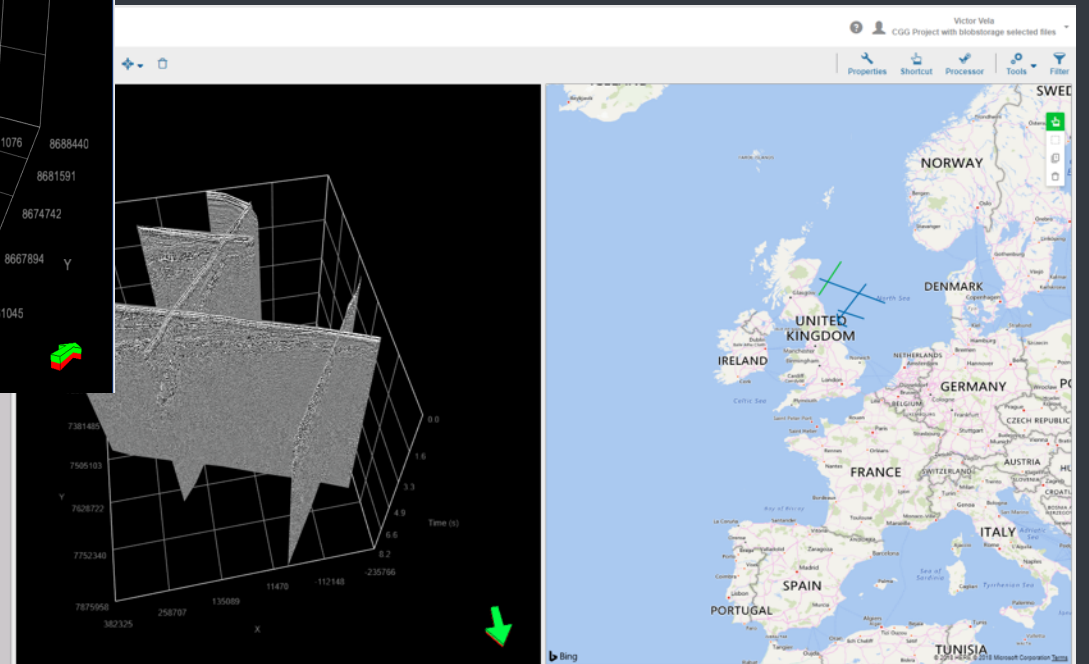
QC Coring Data

# Seismic Acquisition, Multiclient Integration



Visualization of SGY-ZGY files,  
Integration with Bluware VDS

Fault Picking

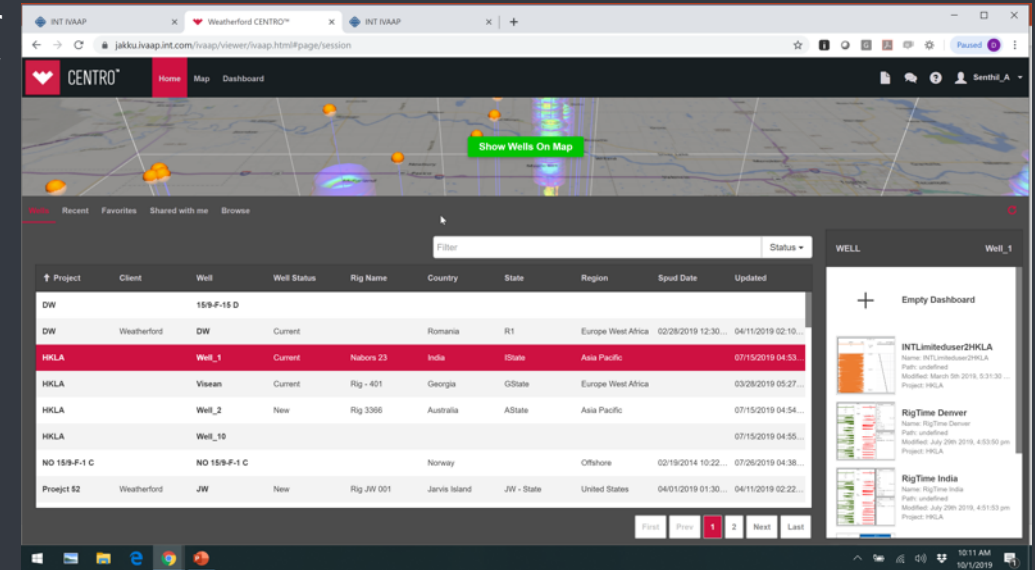
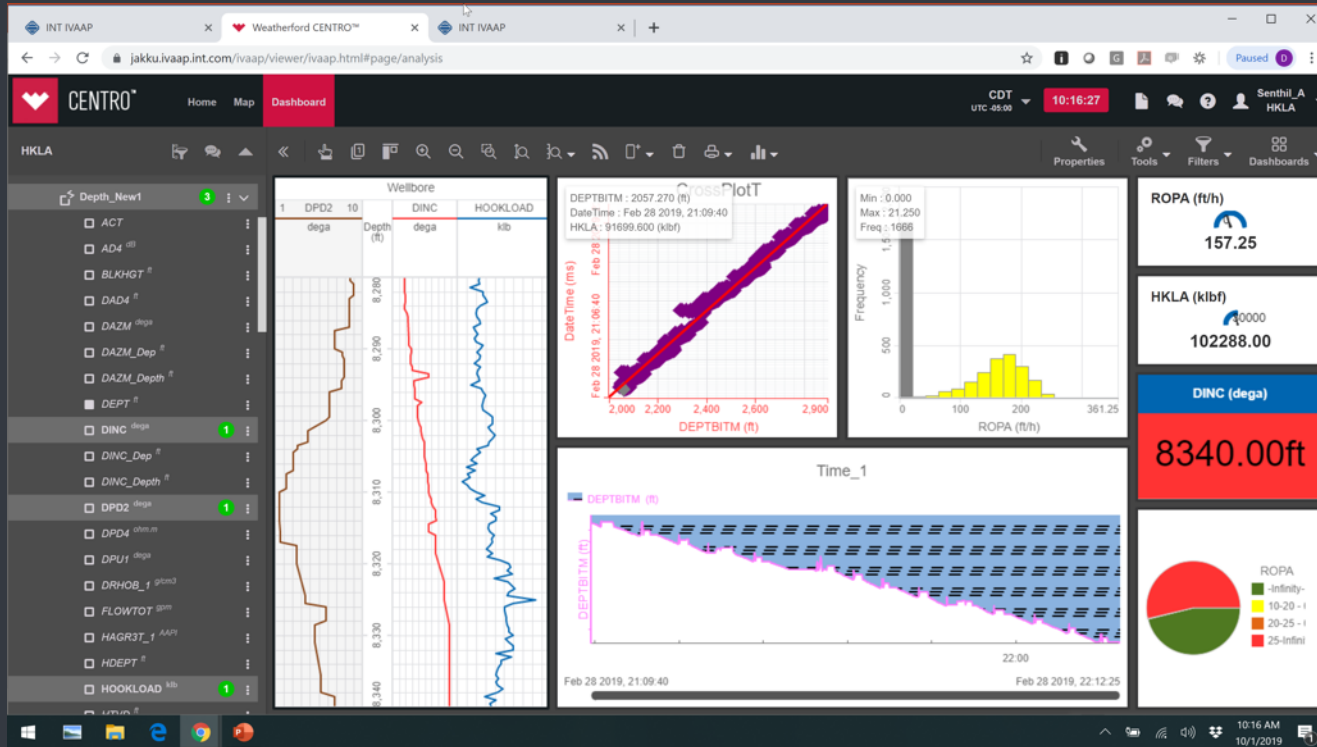


# Drilling and Evaluation, Collaboration

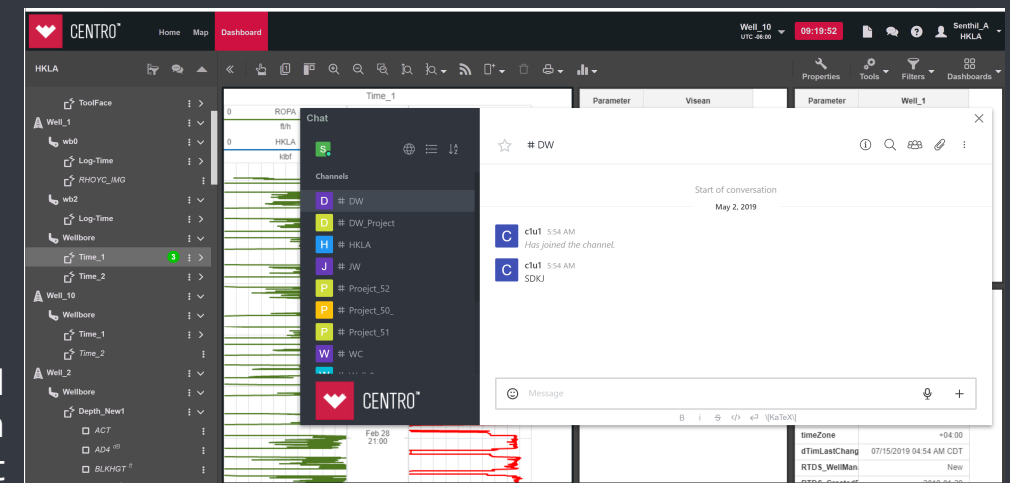


UX/UI customized to Weatherford branding and user flow

UI customization for well-centric view



Collaboration (dashboard sharing), messaging with "Slack" features per project



# About INT

**30**

*years as an  
**established**  
software company*

**110+**

*leading **E&P** companies  
use INT for complex  
**data visualization***

## GeoToolkit



## GRAPHIC & WIDGET LIBRARIES

Developer toolkit for petrophysical, G&G, E&P  
2D and 3D visualization

## IVAAP



## UPSTREAM DATA VISUALIZATION PLATFORM

Cloud and-mobile enabled (HTML5)  
data visualization enterprise framework

## Services



## CUSTOM VISUALIZATION DEVELOPMENT

Expertise in E&P visualization and data access libraries  
& platforms in the cloud

