IVAAP 2.10
Features and
Architecture Overview

IVAAP™

E&P Data Visualization Workflows Supported

G&G

Visualize and interact with Seismic and Well data (seismic volume, horizons, faults and well log, well trajectories and tops)

Visualize multi-well tops correlation

Web portal to access and visualize geo-referenced G&G data

Map Search & filter of G&G data and visualize Wells, Seismics documents and other G&G data into predefined dashboards

Support for ArcGIS layers and features

User-based workflow integration for processing and Machine Learning

Support for Shapefiles and GeoTIFF files

Drilling

Monitor real-time drilling data by streaming from WITSML server (1.3.1, 1.4.1)

Geosteering workflow

Combine seismic and well data views

Connect and visualize 3rd party scientific drilling engines with Well Data (drilling string mechanics, torque and drag, vibration motors....)

Display directional data (actual versus planned trajectories)

Display BHA data and schematics from external database (Peloton, WITSML...)

Monitor NPT (Non Productive Time) and rig activity

Support for WITSML 2.0 (for historical data)

Wireline

Conduct Quality Control (QC) on log data

Visualize formation evaluation

Combine displays log data, directional, lithologies, formation tops

Monitor in real-time wireline data

Completion

Run casing monitoring

Display well schematics—plan vs. actual

Display perforation intervals

Production

Monitor multiple individual well parameters connecting to external production data servers (OSIsoft server)

Display and monitor sensors, captors and equipment data from SCADA systems

Provide alarm messages for abnormal conditions

Control real-time opening and closing valves

Decline curve analysis

Visualize break-even point

Automated reporting capabilities

Interactive Visualization

Generic

Responsive web design interface

Interactive docking framework (dashboard organization by users)

Interactive visualization manipulation (pointing, clicking, selecting, dragging, dropping)

Touch screen support

Visual/gestural manipulations: multitouch operations such as pinch and zoom, rotate, and flick. 3D visualization rotation by three (x, y, z) axes.

Dashboard and Template system with sharing capability

Capability to publish a dashboard and share it with other users

User driven Dashboards templates management (save, restore)

Synchronization between charts

Access to math engine (integrate with external math engine or use internal formula engine)

Formula macros: Moving Average, Despiking, Lower Despiking, Fill Gaps

Real-time visualization refresh screen

Rich chart editing with formatting options

Global data search

Global data filtering or per data set

Navigation Features

Show/hide data tree

Dark UI mode

Favorites, Recents, Home, Dashboard pages

Right side menu to access State definition, formula editing, themes and publishing

Home Page

Home page Map Centric, Well Centric, or Dashboard Centric

Shared dashboards with users or groups

Search, list of dashboards

Dashboard menu options available from thumbnail and dashboard list NEW

Thumbnails of most recent dashboards and dashboard templates

Access to most recent projects from Home page

Map page accessible from the navigation bar with search and filtering options

Create and update projects using maps

Dashboard Page

Data Tree

Data tree access to Project data, dashboards and templates

Quick access to project content

Collapse data tree

Manage and share dashboards

Manage and share templates

Group data sets by categories

Shows widget type as title after widget creation

Set interval for data requests

Access to metadata information (for well metadata)

Support floating toolbar in publish mode

Project content updated automatically

Delete top and top set from data tree

Delete formula curves

Color well icon by group

Visualization Area

Organize chart widgets using the docking framework

Custom widget grouping

Add a new row of widgets

Full screen widget

Move widget

Split area horizontally or vertically

Display metadata into widget title

Tooltip displayed on active widget only

Notification dialog for errors, warnings, and process status

Theme manage globally or locally inside a widget

Toolbar

Quick access to widget functionalities

Quick access to object properties

Quick access to tools

Quick access to data filtering

Quick access to shortcut

Quick access to processor

Dashboard name visible into the navigation bar

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Types of Visualization

Well log

- Support for Single Data, Multi-Data, Multi-Parent mode
- Time or Depth indexed data
- View log curve / array curve / discrete curve
- Array log vertical interpolation
- State definition support for annotation curve
- Display log curve line / symbol / value with micro-positioning
- Display log fill between curves / track borders / base lines with gradient
- Display lithologies
- Display annotations
- Display stacked curves
- Display tops
- Display schematics
- Display perforations
- Display casing
- Display Open Hole section
- Display interval curve
- Converts curve to logarithmic automatically when adding to a logarithmic track in WellLog widget
- Support for annotation curve editing
- Combined display (log, mudlog, trajector, schematics, images) synchronized while switching well
- Real-time mud log
- Switch main index
- Follow real-time updates
- Support real-time updates with ascending or descending depth index
- Support multi-datasets
- Support vertical / horizontal orientation
- Discrete editing
- Top editing
- Annotation curve editing
- Support for tadpole
- Support state definition for symbol color filling
- Manage order in curves displayed in track
- Shortcut to favorite templates
- Curve dictionary and Curve aliases support
- Autofit to quickly scan multiple wells
- Scale visible in the header of index track (optional)
- Scroll bar position save/restore
- WellLog widget header (PDF printing)
- Export to PDF with interval settings
- Support for footer
- Curve value tooltip at cursor position

Well Section

- Display vertical fence along a well trajectory in TVDSS versus Measured Depth
- Option for project ahead trajectory display
- Display seismic background
- Display well log template
- Display well tops

Correlation Display

- Add/remove wells and wellbores
- Apply well log template
- Zoom in/out individually or all wells
- Scroll up/down individually or all wells
- Reset well position
- Synchronize spacing between wells
- Apply well log template
- Horizontal scale
- Add/remove tops
- Top editing
- Save tops to database
- Raster log support
- Supports horizontal scales
- Switch raster log
- Switch log
- Curve dictionary and curve aliases support
- Create correlation fence from Correlation widget and edit in Map widget
- Interval name in top state definition
- Shortcut to favorite templates
- Ghost curve support
- Flatten on top
- Flatten on index value
- Align Wells to top or bottom measure depth
- Definition for colors and pattern created from displayed tops
- Print to PDF

Report

- Display report template
- Support for tables and metadata
- Custom created reporting dashboard

Spectrum

- Analyze seismic data spectrum
- Compare multiple parts of data in one chart
- Support both time domain and depth domain data
- Switch between analysis modes: Amplitude, dB Linear, Phase, Wrapped Phase, Power
- Apply Filtering / Windowing / Smoothing / Phase Trend Removal processors

3D View

- Display 2D seismic, inline, crossline, time slice, arbitrary line
- Display multiple inlines, crosslines and time/depth slices
- Display surface map
- Display horizons
- Display faults and fault sets
- Display reservoir grid and properties
- Support state definition on reservoir data
- Display wellhead
- Display well tops
- Display correlation fence
- Display trajectory fence
- Display trajectory line
- Display trajectory tube
- Display survey stations
- Display curve tube
- Display cylinder log
- Display plane log
- Drag & drop multiple objects from the data tree
- Use state definition on curve tube, cylinder log and plane log
- Display point set data with symbol color and size based on properties values
- Display intersection between inlines/crosslines and horizons, surfaces, faults, triangle mesh, reservoir
- Highlight selected object
- Apply property change to current object or all same objects
- Trajectory vertical elevation support
- 3D crosshair with projection on 2D plans
- Switch between free camera and follow cursor mode
- Synchronize cursor tracking with 2D Seismic widget
- Option from time slice compression
- Support for AGC noise reduction
- Support data with no CRS
- Seismic support for transparency
- Support for contour lines on horizons and gridsurfaces
- Support for well casing, casing shoe, tubing, perforations
- Synchronize well cursor with Schematic widget
- Synchronize cursor between seismic volume and Basemap widget

2D Seismic

- Display inline, crossline, horizons
- Quick access tool bar for inline and crossline selection and navigation
- View SEG-Y / SU / SEP / JavaSeis / ProMAX / SEGD / SEG2 / OpenVDS
- Support seismic compression
- Navigate seismic survey
- Display wiggles
- Display variable and interpolated density
- Display positive and negative fill with solid color or gradient
- Reverse polarity option
- Reverse gradient option
- Display gaps in seismic profile
- Display EBCDIC information
- Binary/EBCDIC copy to clipboard NEW
- VDS 2D dataset support NEW
- Header information dialog
- Apply Filter / AGC / Reverse processors
- Fault display support
- Fault editing
- Create Fault set
- Support for overlay display

Map

- Support for Web Map Tile Service (WMTS): Google, Bing, OpenStreetView...
- Support for GeoJSON
- Support for multiple feature layers
- Support for ArcGIS feature layer
- Support for multiple ArcGIS servers
- Support for Bing Aerial Maps
- Support for search directly through data store
- Display seismic lines
- Display wellhead location
- Display and edit well correlation fence
- Select seismic line and wells
- Individual or area selection
- Metadata for selection object displayed on map
- Interactive well grouping on map

Drilling Status

- Display real-time BHA position
- Zoom in and out
- Select among pre-defined BHAs

Schematics

- Display schematic data
- Support for casing, tubing and BHA
- Animated BHA (fluid, debris...)
- Support for perforations
- Cursor tracking with WellLog
- Display Open Hole section
- Display deviated schematics
- Tracking with 3D widget
- Tabular version display in table widget

Statistic

- Support multi-datasets
- Curve dictionary and Curve aliases support

HTML

- iframe support
- Time or Depth indexed data
- Support switching between well and wellbore

Gauge

- Support for real-time updates
- Support for visual alarms
- Gauge type Tracking NEW
- Gauge type Tracking Bar
- Gauge type Digital
- Gauge type Full Circular
- Gauge type Half Circular
- Gauge type Quarter Circular
- Gauge type Multiple Tracking
- Gauge type Vertical / Horizontal Bar
- Gauge type Real-time gauge used to display activity status
- Curve dictionary and Curve aliases support

Value Tracker

- View log curve value
- Support multi-datasets
- Support and follow real-time updates
- Support for state definition
- Curve dictionary and Curve aliases support

Title Widget

- Display data set name
- Display real-time status
- Option for free text
- Support for metadata keywords

Image Widget

- Display PNG, JPEG and TIFF files

Diagram Widget

- Display SVG file
- Support for simple animations
- Support display curve values updated with cursor position or real-time
- Support for state definition

Table View

- View log curve
- Support multi-datasets
- Follow real-time updates
- Support for state definition
- Lock on name NEW
- Create State definition from the widget NEW
- Customize column (filter, align) NEW
- Support for header wrapping
- Support for column sorting
- Ability to hide Title NEW
- Fit Column to the width of the widget NEW
- Improve template saving NEW
- Supports formatting for each column
- Display top set table
- Support cell wrapping
- Optimized default column width
- Pivot Table
- Display pivot table
- Calculate statistics
- Aggregate table data
- Spreadsheet Table
- Display table data
- Support multiple spreadsheets
- Curve dictionary and Curve aliases support

Line Chart

- Lock on name for tabular data NEW
- Range support for tabular data NEW
- Cursor tracking
- XY line chart with option for markers display
- Support for multiple data series
- Display mode for Single Data, Multi-Data or Multi-Parent
- Support for multiple axis
- Support for annotations
- Curve dictionary and Curve aliases support
- Multi-data set and multi-parent support for logs
- Option for tracking along wellpath in 3D View widget

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Types of Visualization

Scatter Plot/ Cross-Plot

Support third dimension using gradient color or state definition

Curve dictionary and Curve aliases support

Support for regression line linear and non-linear

Cross-hair in color bar

State definition support

Filtering content based on state definition

Discrete editing

Export to PDF

Time Series Chart

Support for Single Data, Multi-Data, Multi-Parent mode

Display one or multiple time series

Support for color filling between series

Support for state definition

Support for real-time

Support for table data

Support for Annotations

Support for Perforations

Support for logarithmic mode

Bar Chart

Range support for tabular data

Lock on name for tabular data

Accumulation mode

Display discrete curve

Line display option with show / hide markers

Support for continuous curve with state definition

Support for table data

Support for real-time update

Basemap

Display seismic slices, inline, cross-lines

Display horizons, gridsurfaces, triangle mesh, faults

Display reservoir layer

Display well locations, well trajectories

Drag & drop multiple objects from the data tree

Support for contours

Support for transparency

Export to PDF

Pie Chart

Support for tabular data NEW

Lock on name for tabular data NEW

Multi series support for tabular data NEW

Cursor tracking for tabular data NEW

Display discrete curve

Support continuous curve with state definition

Support for real-time update

Histogram

Analyze seismic data distribution

Support frequency types: absolute, normalized, relative

Export to PDF

Curve dictionary and Curve aliases support

Platform

HTML5 (JavaScript) based client

SDK based workflow integration for Machine Learning

Cross-platform desktop, tablet, mobile support

Cross-browser IE11+ / Chrome / Firefox / Safari / Mobile Safari

White label / branding support

Help system

Highly scalable

Micro-services architecture

Real-time support / acquisition live status determination / near real-time (1s)

Math engine / expression based math solver, statistical functions

Plug-in support for customer processes

Software development kit (SDK) for custom connectors

Software development kit (SDK) for frontend developments

Data Versioning

Annotations

Support for global mnemonics, aliases, units of measure and conversion

Use of Apache SIS for CRS transformations

Resilient and fault-tolerant

Importer/loader for Excel and CSV file

Extensibility (add contextual menus, launch scripts, create own plugins and workflows, public Java API...), embeddability

Support for Seismic indexing for Azure Blob Storage seismic (and soon AWS S3)

Support of OSDU M8

Support for OpenEarth

Support for MinIO and Cloudian storages

Data Management

Objects Supported

Static and real-time data

Well log curve (single and multi-value)

Well tops

Well Lithology and Annotation

Well documents

BHA, Schematics, Completion, Casing, Perforations (SVG, CAD)

Seismic inline, crossline, time slice

Seismic geometry: Prestack, volume, 2D lines

Horizons, Faults

Grid surfaces

Reservoir grids

Point Set

Time series data, OSIsoft tag

Table, SQL queries

WITSML 1.3.1 and 1.4.1 objects (Well, Wellbore, ChangeLog, Log, Message, MudLog, Risk, Trajectory, Tubular, WbGeometry)

File Formats Supported (Extensible)

Seismic: SEG-Y, SEG-D, SEG-2, INT Indexed XGY, SU, INT Indexed SU, SEP, OpenVDS, JavaSeis, Promax, Indexed Promax, CST, Indexed CST

Grid Surface: Open Works, Petrel, Global Mapper, ASCII R5000/ OSDU, GeoCraft, Kingdom Horizon, XYT

Horizon: IXTA, INT XML Horizon, ASCII R5000/ OSDU

Fault: INT ASCII Fault, ASCII OSDU, Petrel ASC, Kingdom Fault

Point Set: INT ASCII PointSet, INT XML PointSet

Reservoir: RESQML, Eclipse ASCII Grid

Triangle Mesh: GOCAD/ TSURF, XYZ, Petrel DAT

Cultural Data: PNG, JPG, GIF, SVG, TIFF

Tops: ASCII

Well Data: LAS 2.0, LAS 3.0, DLIS, ASCII

Well Survey: ASCII

Well Document: PDF

Diagram: SVG

Connectors

MongoDB

NoSQL

OpenEarth

INTGeoServer

INT Geofiles

SQL

Peloton

WITSML (data streaming directly into WITSML server)

OSIsoft

Relational Query Access

PPDM

ArcGIS

Amazon AWS S3

Microsoft Azure Blob Storage

Google Cloud Data Storage

EIA (US Energy Information Administration)

MinIO

Cloudian

CosmosDB

Security/System Management

Admin

Import files (CVS, LAS, ASCII, WITSML)

Import wellhead information

Import formation tops

Import new users list

Import curve, curve alias, and unit dictionary

Import schematics dictionary

Import raster files

Import JPEG, PNG and SVG files

Import pointset data

Import by reference for well documents, LAS, grid surfaces, point set, horizons

Time zone support for CSV

Server pagination for Users, Groups, Projects

Added date/time services to the table

Active / Deactivate users in bulk

Share and copy templates to groups NEW

Share state definitions and formulas

Manage cloud services

Seismic cloud indexer

User Management/Preferences

Manage domains, groups and users

Manage data access permissions

Manage connectors and queries

Manage projects

Manage dashboards and templates

Manage domain resources (pattern files, audop files, templates,, map services)

Manage sharing between users and groups

License management

Security

Authentication (Single, Sign-on, SSL)

SAML support

Authorization

Encryption

Usage monitoring, auditing

Auditing support

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