Speaker: Mr. Zack Warren

Speech Title: "Oil & Gas Data is *Different* – Frameworks and Trends in Modernizing O&G Tech"

When: Thursday, March 10th, 2022

Where: Zoom Videoconference

Presentation Begins: 12:00pm CDT

Abstract: The oil & gas industry has been incredibly innovative in some areas of technology, while it's notoriously old-school in others. Why has upstream O&G been slow to adopt modern approaches for software and data science? This presentation will introduce frameworks and present real data to help explain what E&P companies need to be doing to bring the promise of O&G tech innovation closer to reality. We'll pay particular attention to issues within the Reserves and Evaluation space with workflows like automated decline curve analysis, reserves booking, and financial reporting.

Bio: Zack Warren is a data analytics leader and reservoir engineer with over 18 years of experience. In 2021, he founded Velocity Insight to be a full-stack, full-function data management/analytics consulting firm focused on upstream oil and gas. Most recently, he was the Director of Strategic Studies & Analytics at Great Western Petroleum, leading data analytics and reservoir characterization efforts. He started his career at ExxonMobil, with additional experience at Netherland, Sewell, & Associates and various tight oil operators. Zack is a professional engineer in Texas and Colorado, a member of SPE, and serves on the Board of Directors for the Society of Petroleum Evaluation Engineers International.
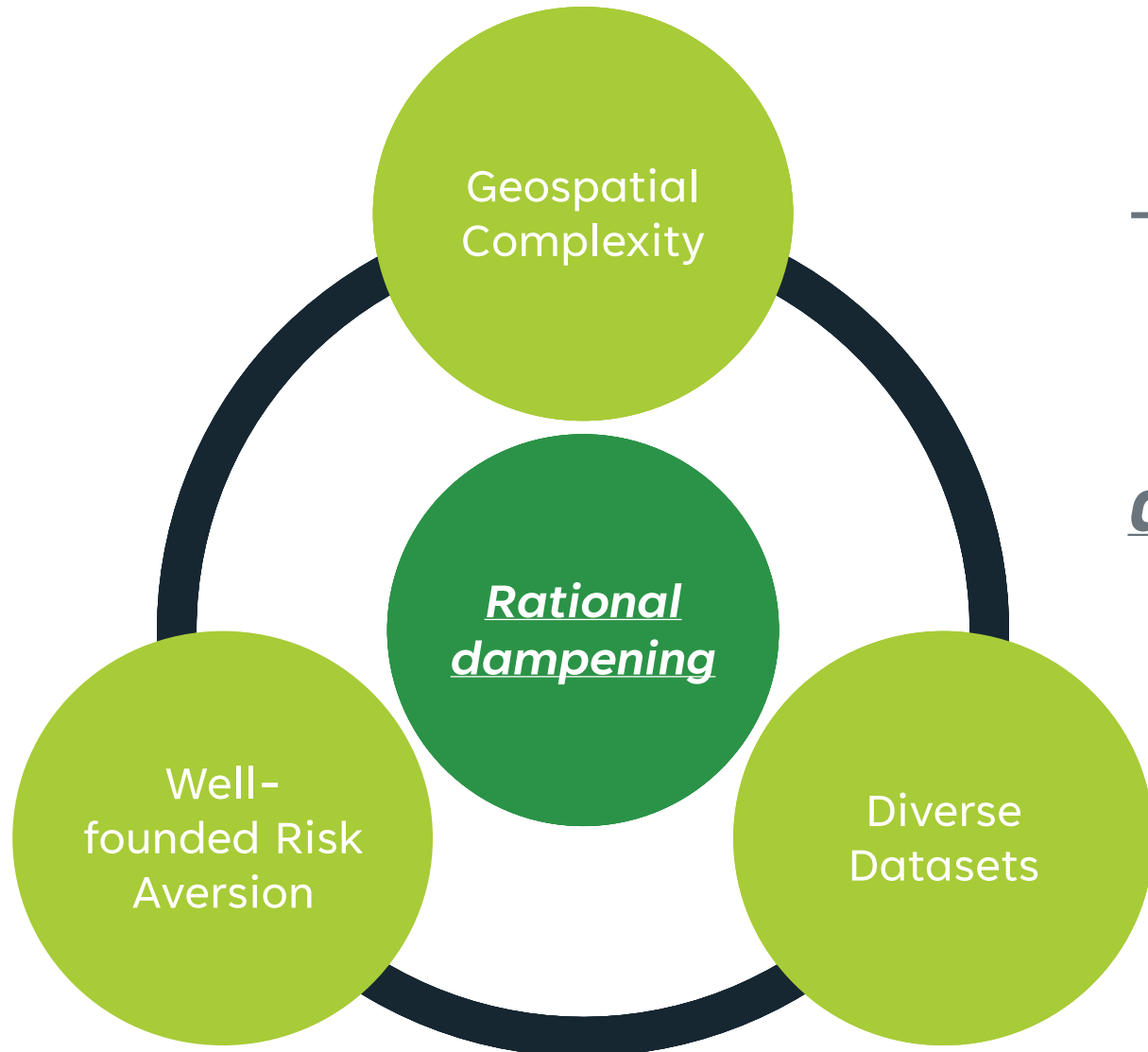
OUTLINE

- Orienting yourself in 2022
  - O&G Data is *Different*
  - The Data Pyramid
  - The Software Proliferation Landscape
  - The Big Six

- 2021 E&P Software Survey Results

- How do Reserves and Economics fit in?

O&G DATA IS *DIFFERENT*

Geospatial Complexity

Rational dampening
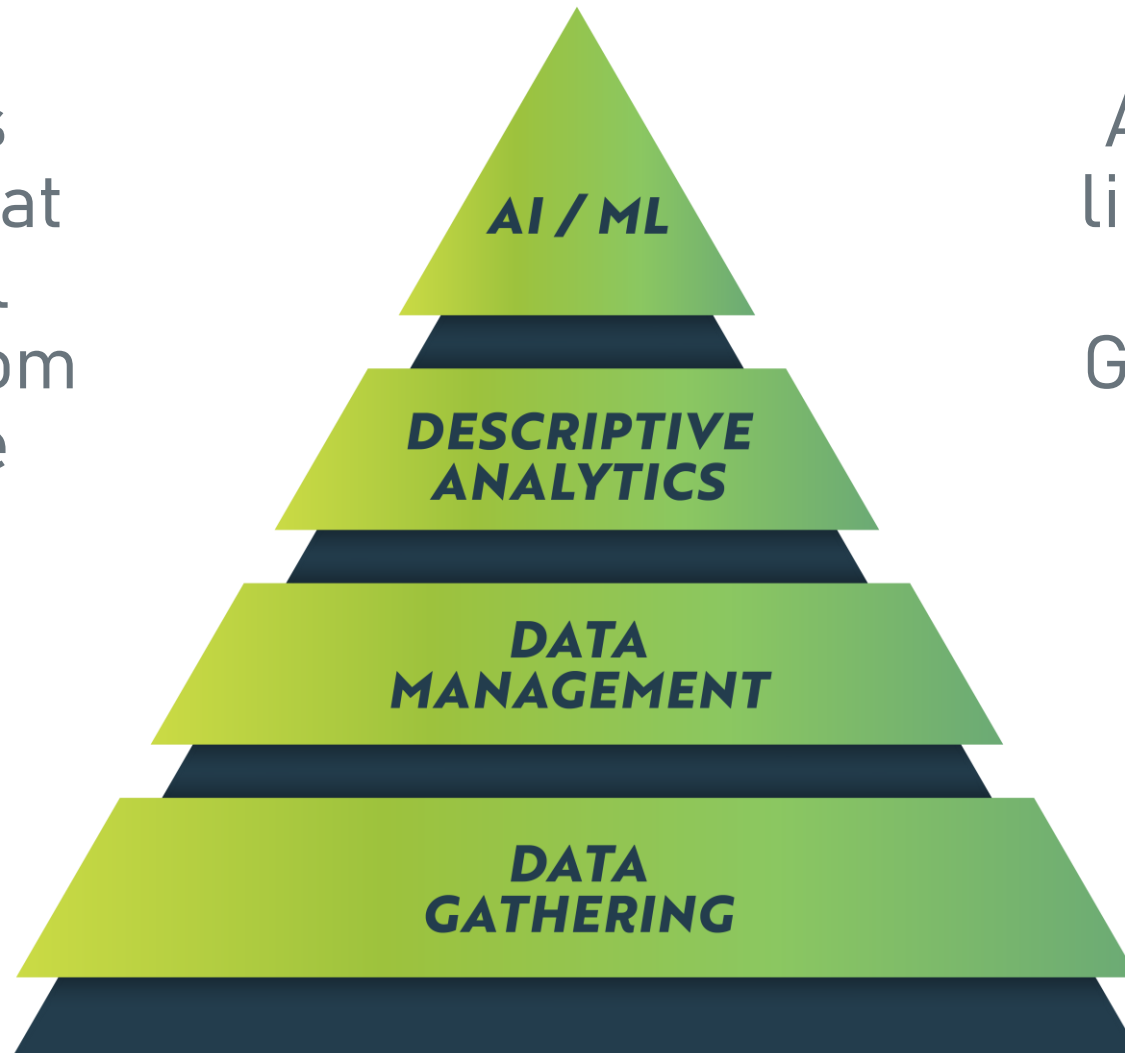
Well-founded Risk Aversion

Diverse Datasets

There are some *good reasons* E&P digital transformation has been slow, and they both *dampen* and *differentiate* how O&G can and will change
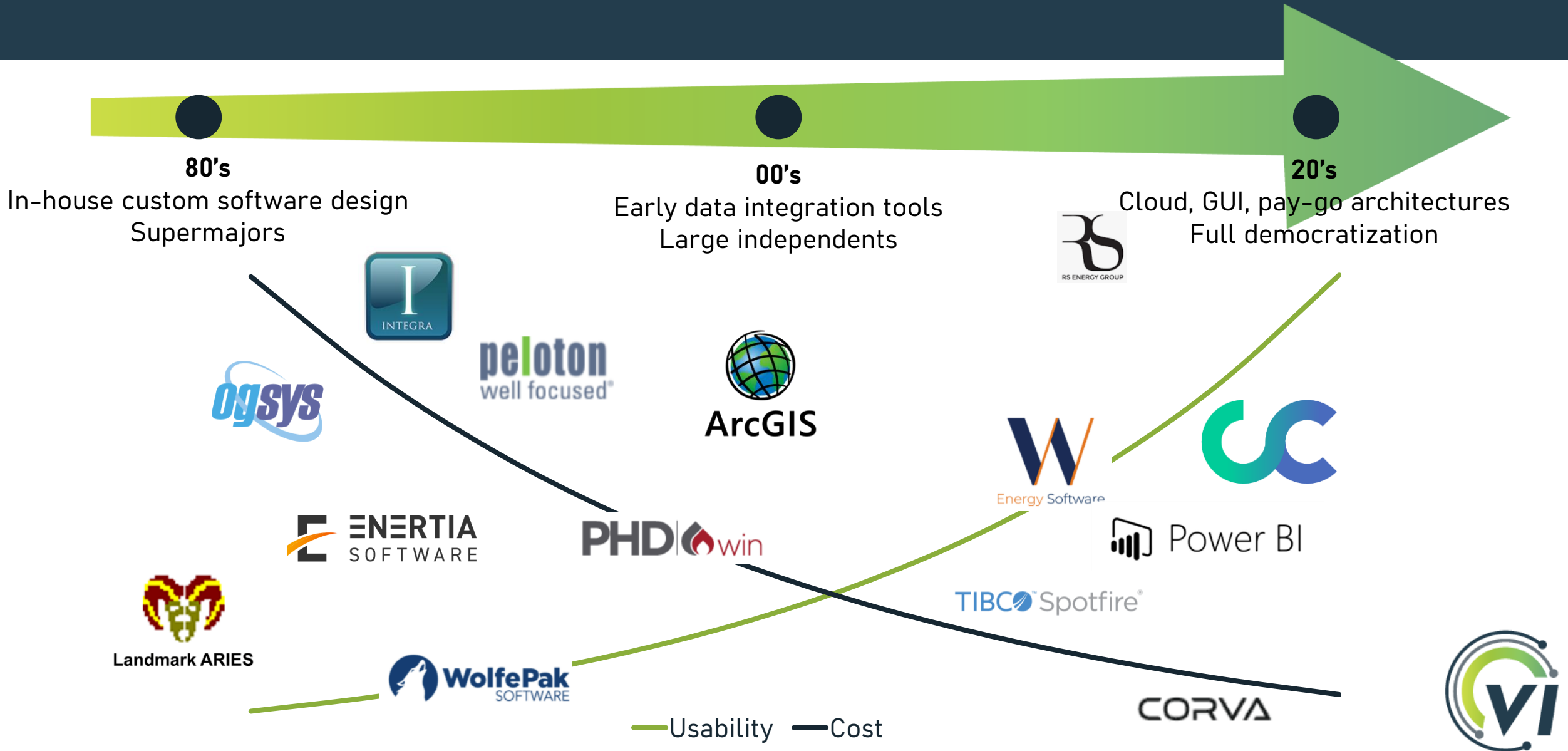
THE DATA PYRAMID

Effort required is arguably smallest at the top – the real work is at the bottom and in the middle

AI and ML are just like other advanced analytical tools – Garbage In leads to Garbage Out
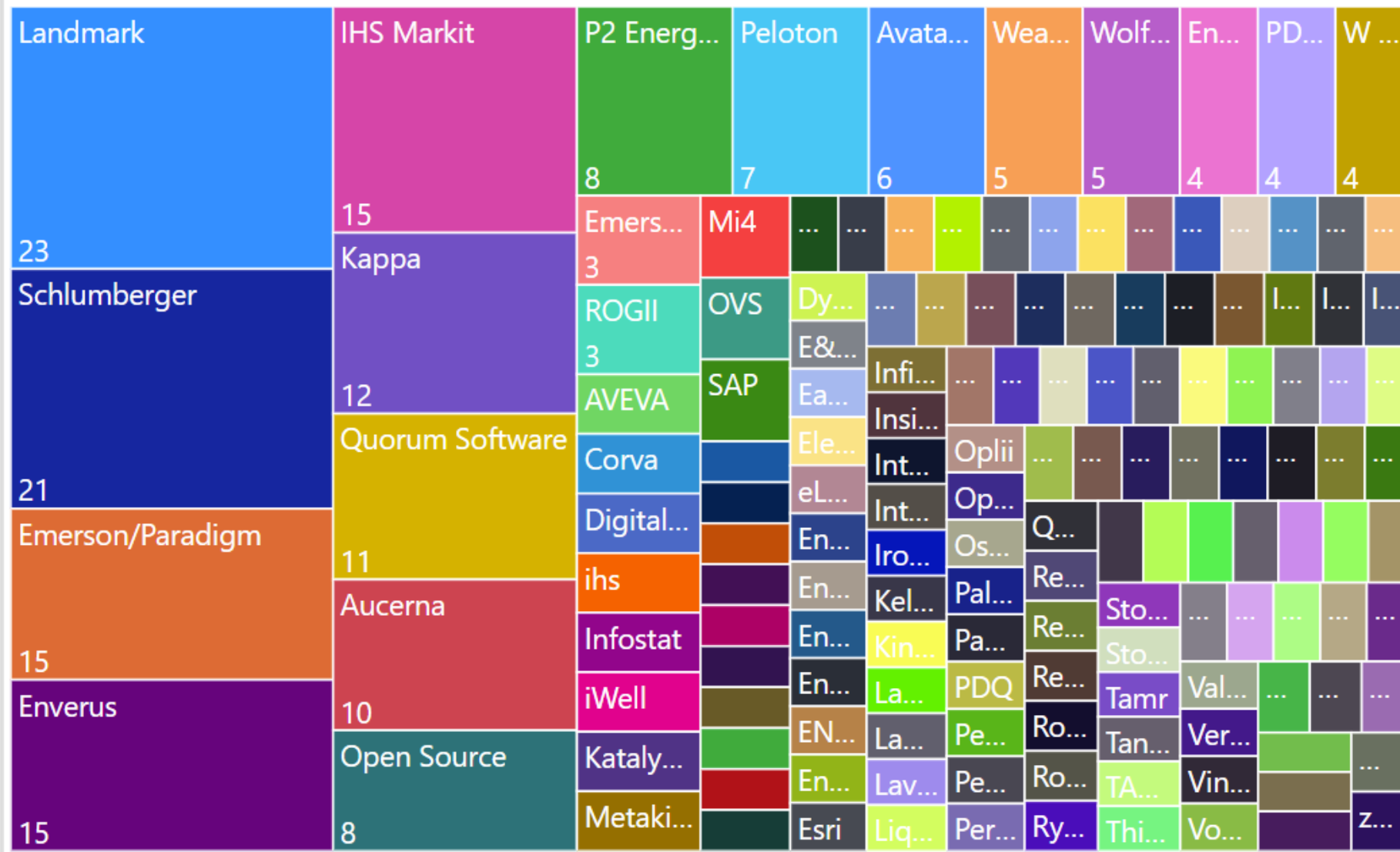
AI / ML

DESCRIPTIVE ANALYTICS

DATA MANAGEMENT

DATA GATHERING

SOFTWARE INVENTORY – 300 AND GROWING

THE BIG SIX

RESERVES/
PLANNING

WELL
LIFECYCLE

SCADA

ERP

LAND

PRODUCTION
ALLOCATION
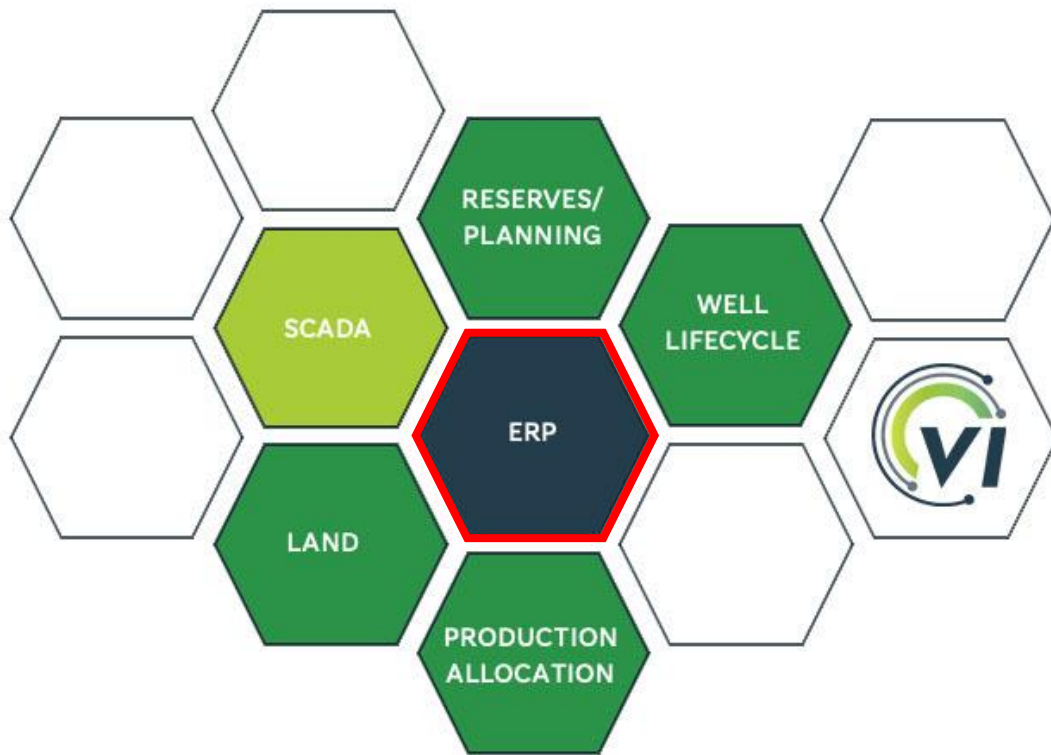
1) Highly integrated with the rest of the Big 6

2) Central to the basic functions of an E&P

3) Expensive to Rip & Replace

THE HEART OF AN E&P

ERP – Enterprise Resource Planning

What it does: Accounting, workflow management, and much, much more

Examples: SAP, Enertia, Quorum, Integra, Bolo, Excalibur, OGSYS, JD Edwards, etc., etc., etc.

THE NEXT FOUR

- **Reserves/Planning**
  - Forecasts production and expenses for budgets and valuation
  - Examples: ARIES, PHDWin, Peep, ComboCurve
- **Well Lifecycle**
  - Tracks wellbore events, equipment, and cost
  - Examples: WellView, OpenWells, WELLEZ
- **Production Allocation**
  - Turns oilfield data into daily/monthly allocated volumes
  - Examples: ProdView, Merrick, Energy Component
- **Land (specific to US/Canada)**
  - Stores mineral leasehold agreements and data
  - Examples: Quorum, Bolo, Excalibur, LandView

SCADA, THE NEWBIE

SCADA – Supervisory Control and Data Acquisition

What it does: High-frequency data collection and automated facility control

Examples: Ignition, WonderWare, CygNet, dozens of others

2021 E&P Software Survey Results

2021 SOFTWARE SURVEY - SUMMARY

- Three big themes:
  - *Compartmentalization – by region, size, business model, etc.*
  - *The Long Tail – hundreds of low-utilization tools on the market*
  - *Widespread Dissatisfaction – "I hate it, but we use _____"*

- Barriers to modernization:
  - High cost of ripping and replacing
  - "We're just about to sell/buy/merge/go bankrupt"
  - Risk aversion
  - Lack of better options

2021 SOFTWARE SURVEY - SUMMARY

- 101 participants, ranging from 1–person companies to supermajors
  - Covers ~65% of US–listed public E&Ps
  - Focused on Lower 48, handful from Europe and Canada
- 497 software implementations
  - Several hundred million dollars in annual software spend
  - 75 separate applications

Copyright 2021 Velocity Insight, LLC

Copyright 2021 Velocity Insight, LLC
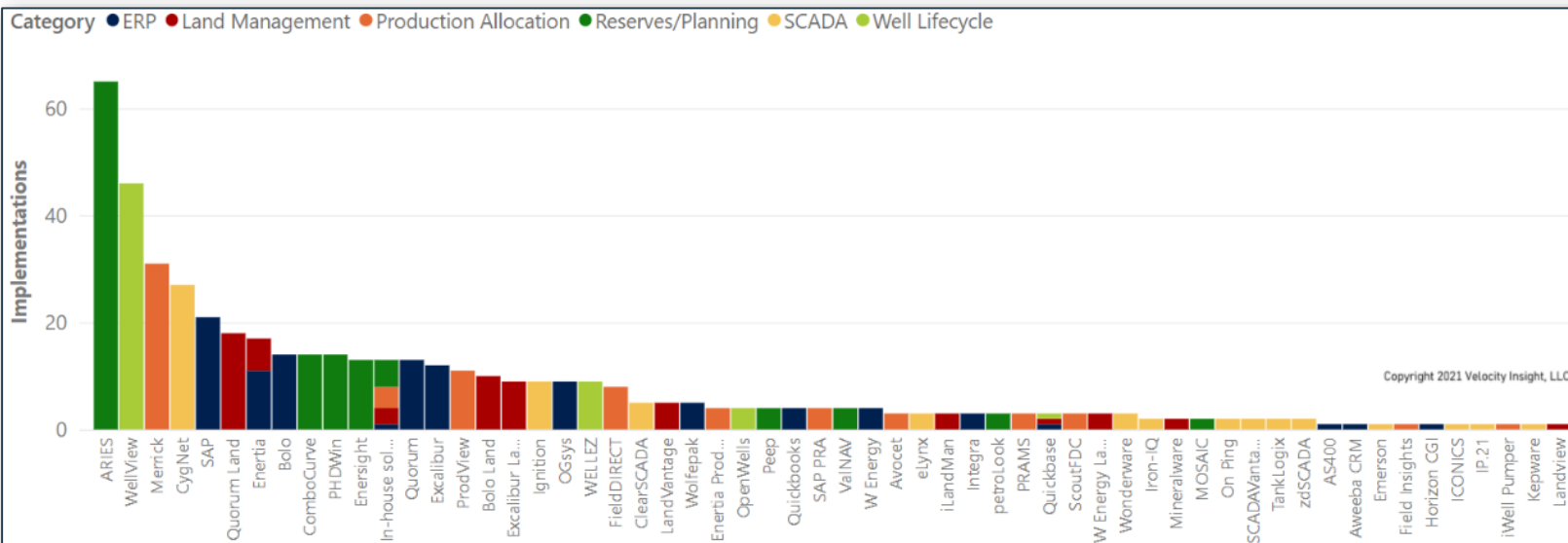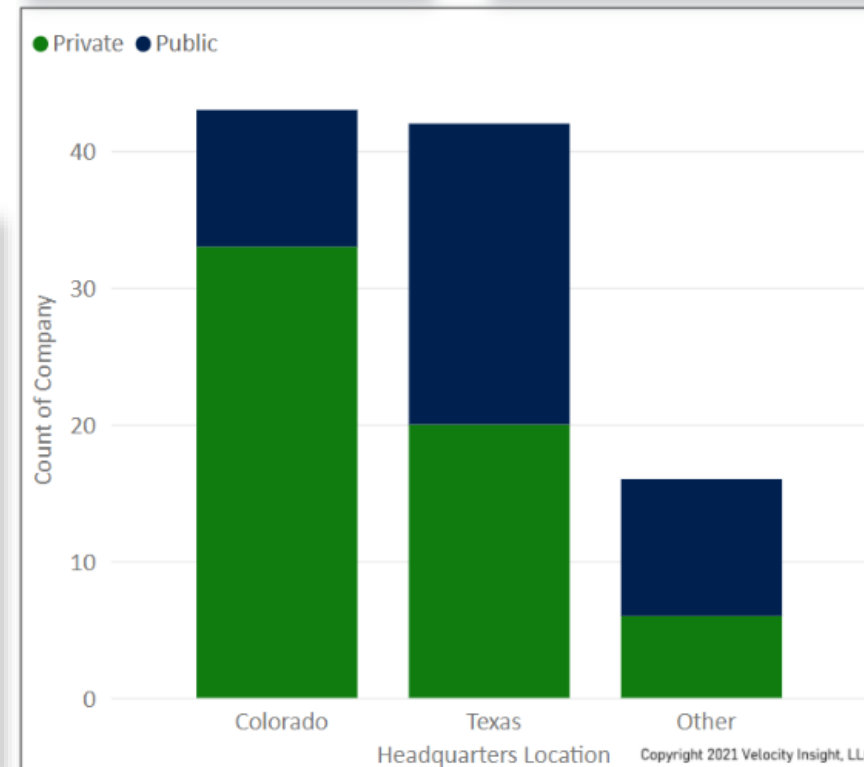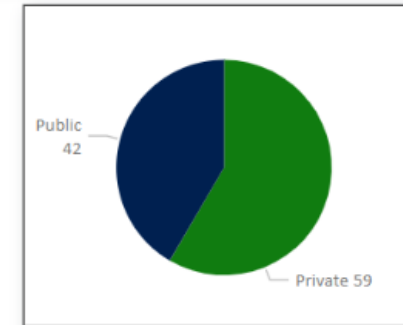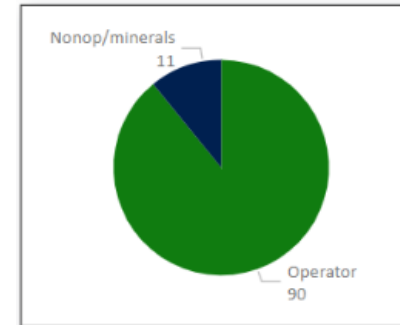
Reserves/Planning

- ARIES dominates, but struggles to handle full workload

- Lots of companies using multiple tools to accommodate limitations – Enersight, ComboCurve, etc.

For a copy of the Software Survey, reach out to askus@velo-insight.com

How do reserves and economics fit in?

RESERVES ARE <u>REGULATED</u>

SEC, PRMS, COGEH, etc. are all "specific fictions"

- Pricing
- Reasonable certainty criteria
- Reliable technology
- Current economic conditions

Lots of eyes on both publicly-traded and privately-held bookings

- SOX compliance isn't just for pubco's any more
- Reserves reconciliation and SMOG disclosures can make mistakes embarrassing
- Publicized debookings aren't easily forgotten
  - Shell Kashagan
  - YE20 price debooks
  - Shale downspacing/parent-child effects

VALUATIONS ARE NEGOTIATED

Lots of stakeholders

- Internal management/politics
- Board of directors/key investors
- Investment bankers
- 3rd party reserves auditors
- 3rd party accounting auditors
- Independent valuation firms (409A, FMV)

Accounting policies box valuations tightly, especially for A&D

- Goodwill is off the table for Upstream assets
- "Bargain purchase" criteria are just as messy
- Goldilocks valuations thread the needle

VALUE PROPOSITIONS

Cheap

- Focus on the bottom of the Data Pyramid
- Fire all the reservoir engineers!
- Automate data processing (aka fire all the techs!)
- Less money on 3rd party auditors

Fast

- Better data access to adjacent functions for commercial parameters like LOE, diffs, CAPEX, etc.
- Outlier detection/data cleansing
- Automated DCA
- Assisted type curve building

Good

- Remove bias, remove bias, remove bias
- Improve run QC to minimize errors
- Discover unexpected factors for type curve binning/scaling

SO WHAT ABOUT AI AND ML?!

Lots of buzz on Artificial Intelligence and Machine Learning – what should we be focused on?

- Automated DCA starting to mature
  - Still needs (will always need?) human in the loop
  - Probabilistic PDP forecasting is interesting, but can it fit into Reserves world?
- Type curve creation making progress
  - Finding "like wells" with clustering algorithms
  - Identifying key attributes with tools like R^2 loss on Random Forest

Key barriers to watch for:

- Reserves are both *regulated* and *negotiated*
  - Rational risk aversion
- Lots of stakeholders
  - If any say no, status quo reigns
  - Explainability will be non-negotiable
- People and Process will be bigger barriers than Technology

WHO WE ARE

Full-stack, full-function data management and analytics consulting firm helping with both **_advisory_** and **_implementation_** projects

Deep O&G Experience

State-of-the-Art Tools

Real-World Digitalization Experience

TO HEAR MORE....

VI News of the Month

LinkedIn

askus@velo-insight.com