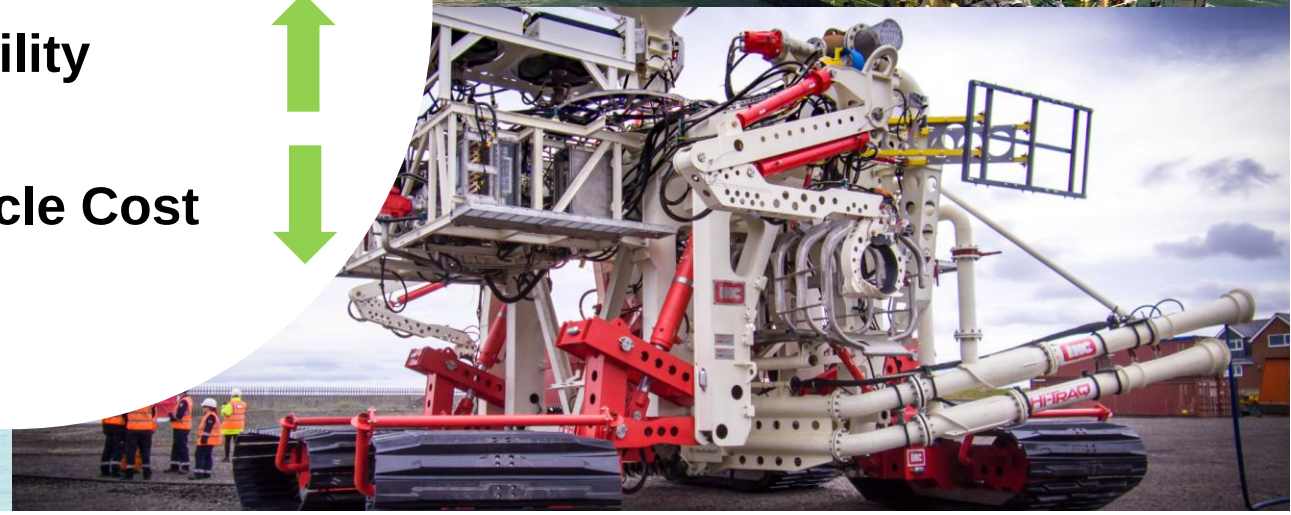
Fleet-Wide Remote Dredging Vessel Monitoring

Daniel Stoyle (Royal IHC) & Martijn Handels (Rolloos)

THE TECHNOLOGY INNOVATOR.

ROLLOOS

Integrator in a digital world

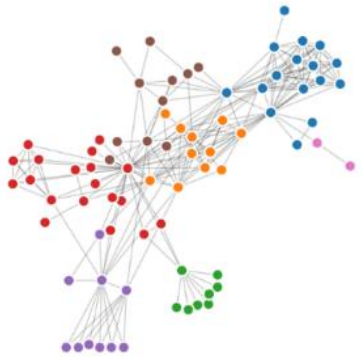


CUSTOMER EXPERIENCE

- Performance ↑
- Reliability ↑
- Lifecycle Cost ↓

IHC's mission is to be an enabler

Enabling digital transformation by providing tools & capability



1. COLLECT & CONNECT

2. ENHANCE & STORE

3. VISUALIZE & ANALYZE

Excellent solutions benefit both customer & OEM

CUSTOMER BENEFITS

- Remote access
- Real time remote monitoring
- Remote support & consultancy
- Intelligent services

OEM BENEFITS

- Design optimization
- Customer experience
- Revenue opportunities
- Warranty

OSIsoft PI to fit challenging requirements

- World-wide operating clients
- None or limited connectivity offshore
- High frequency data
- Different vessel types
- All users must be able to make own dashboard; also clients IHC
- Reliability and data security must be evident

Roadmap

Standard

Custom

	Q1	Q2	Q3	Q4	2019	2020
 Beaver						
 Beagle						
 Mission equipment						
 Custom built						

Gain experience

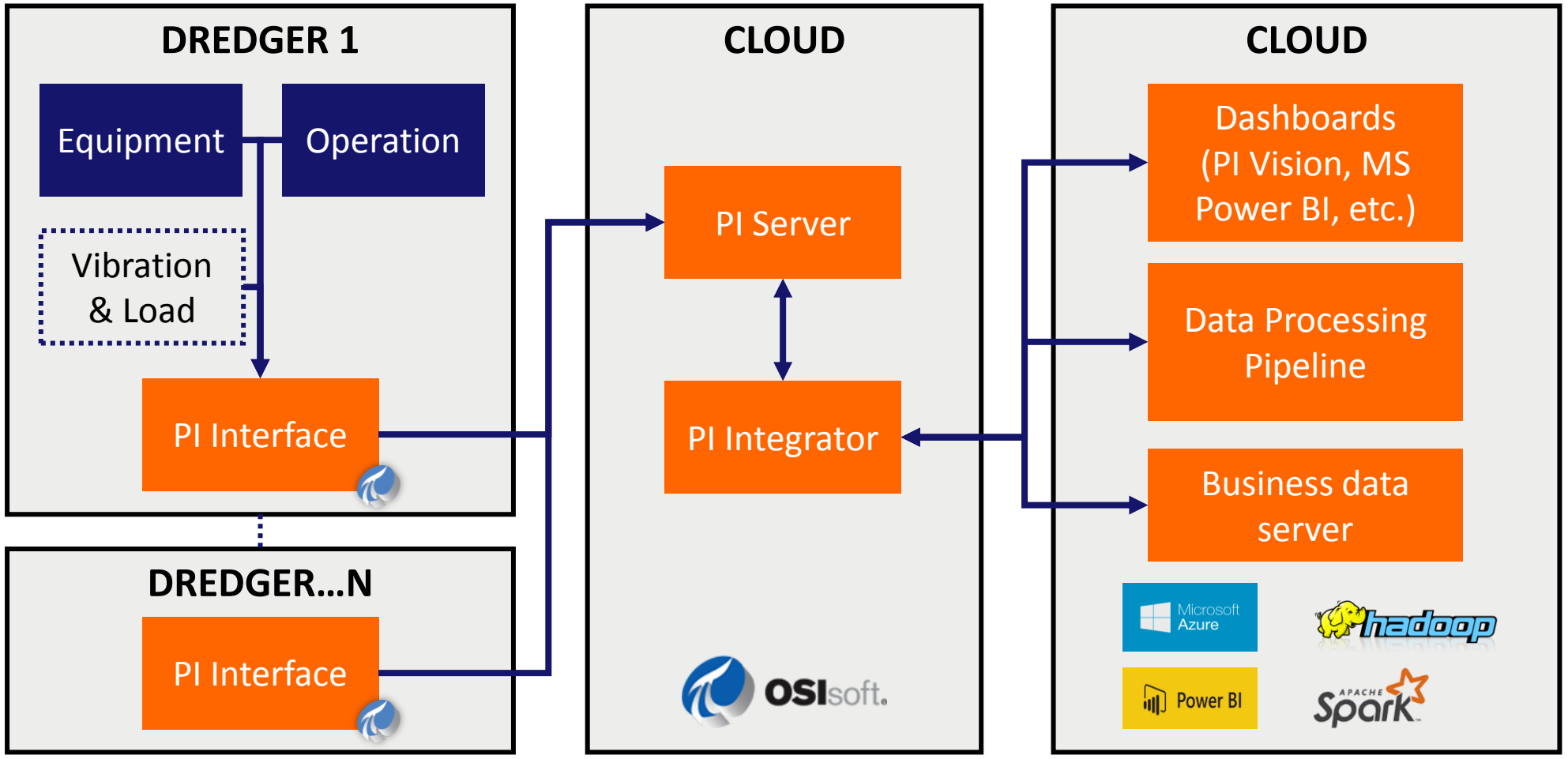
Through small scale pilots

Start with a pilot to get things rolling

Three goals for 3-week pilot:

1. Structuring data of a IHC Beaver Cutter section dredger
2. Visualizing data to monitor fleet, fuel load and alarms
3. Analyzing data to solve custom analytics cases

Structuring data with scalable architecture



Customized dashboards running in no time

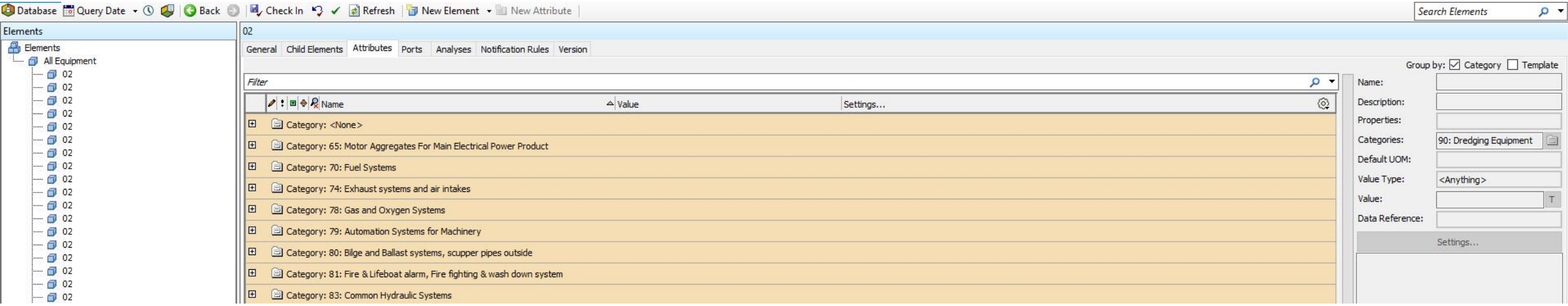
Initial client facing
Through MVP

Launching MVP within 9 weeks

- 22 additional assets connected (Beavers)
- 250 tags + 200 analysis tags per asset
- 50 template based AF analysis calculations including binary alarm de-bit masking logic
- IHC branded PI Vision displays developed
- Multiple sprints to gather feedback on AF analysis and dashboard functionality

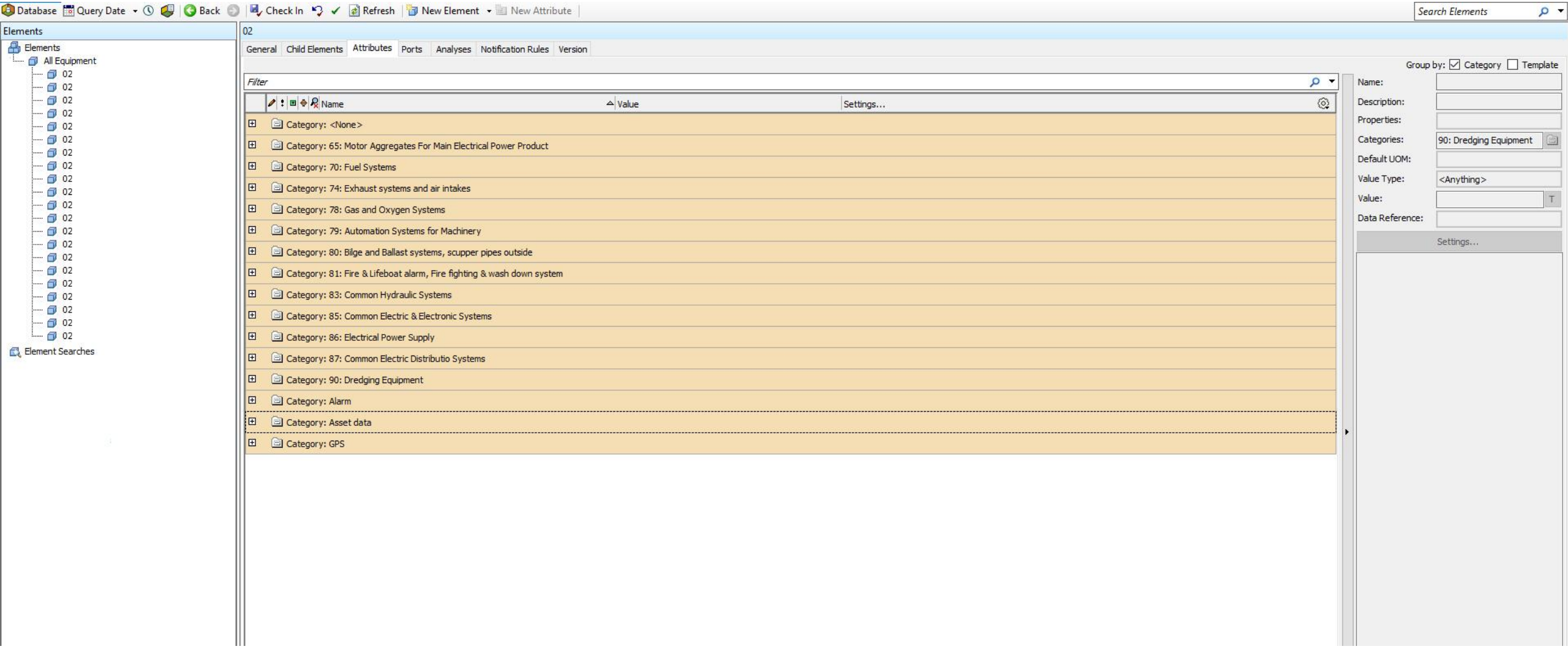

PI Vision
FLEET OVERVIEW
ENGINE ON
ENGINE OFF
02 | BEAVER 50
02 | BEAVER 40
02 | BEAVER 45
PRODUCTION TODAY
FUEL CONSUMPTION TODAY
ENGINE HOURS TODAY
ALARMS ACTIVE
POWER
DREDGE
ALARM
02 | BEAVER
DREDGE LOCATION
PRODUCTION
DREDGE OPERATION
DREDGE PROFILE LAST 14 DAYS
PRODUCTION / FUEL CONSUMPTION

MVP Asset framework

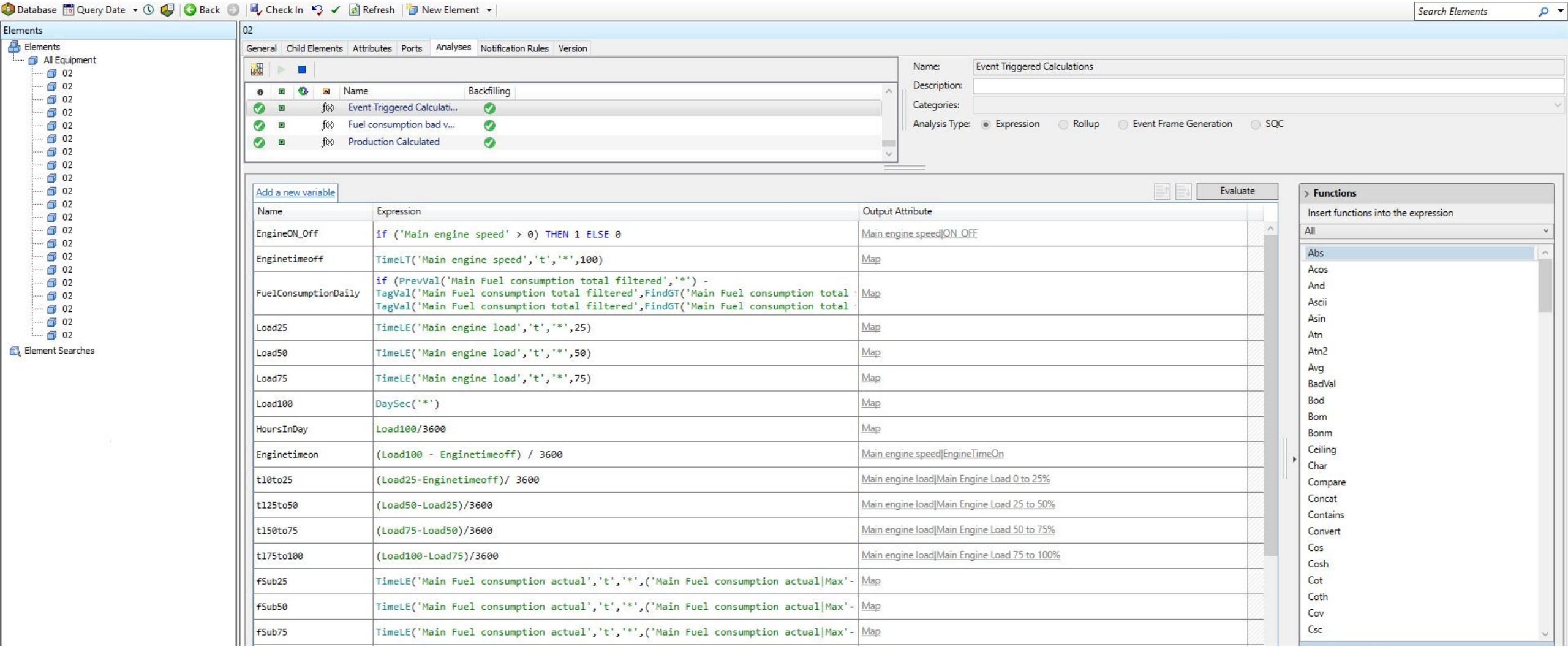


- AF build on flat IFS/PBS structure using categories
- Main templates build vessel-specific
- Asset information captured in AF to change hierarchy using the AF transformation tool

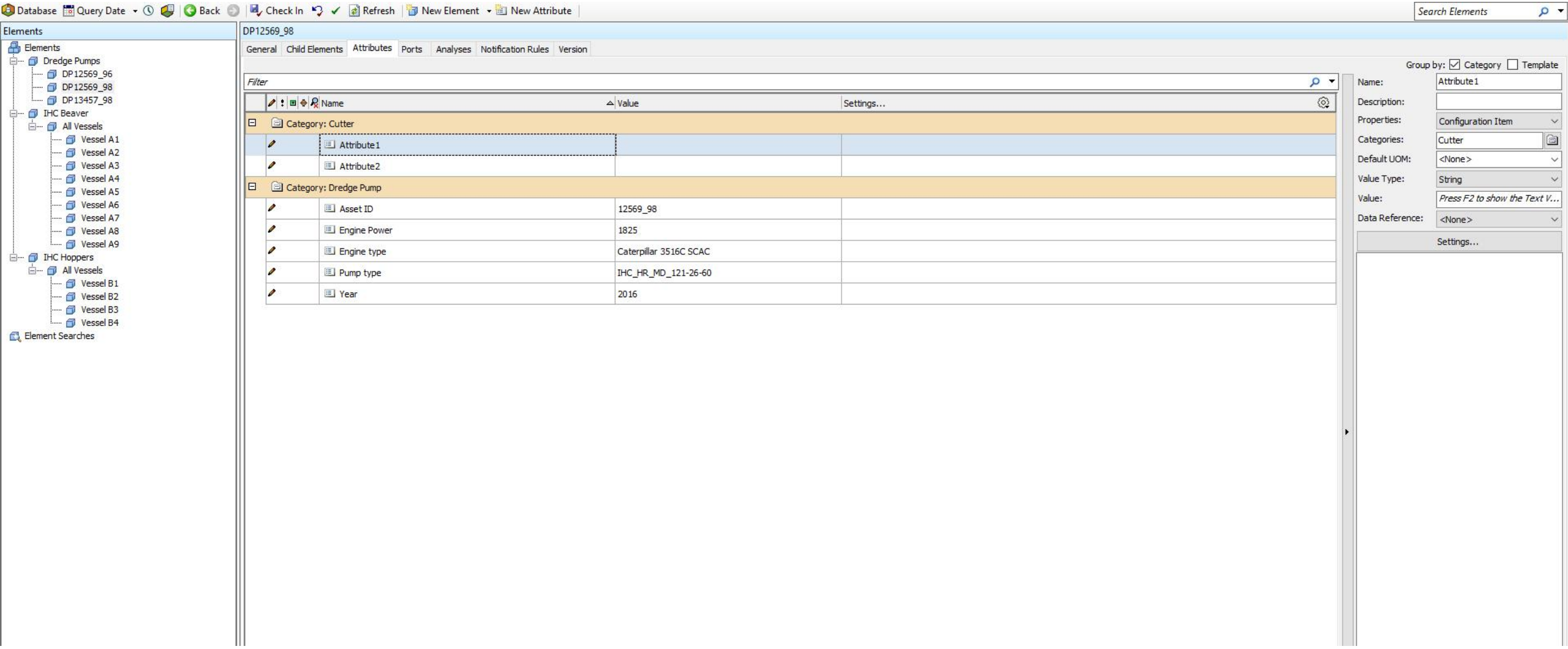
MVP Asset framework – Categories



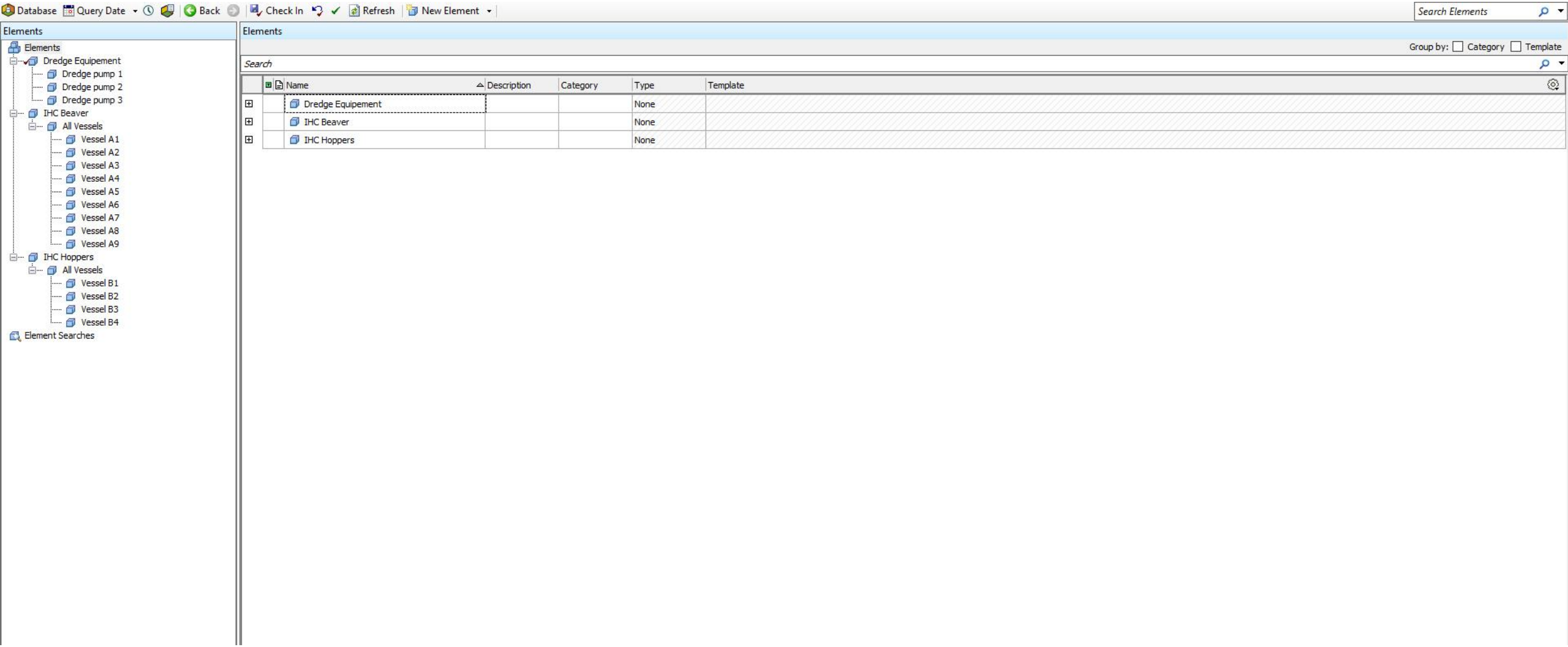
MVP Asset framework – Calculations



MVP Asset framework – Transformer



MVP Asset framework – Assets

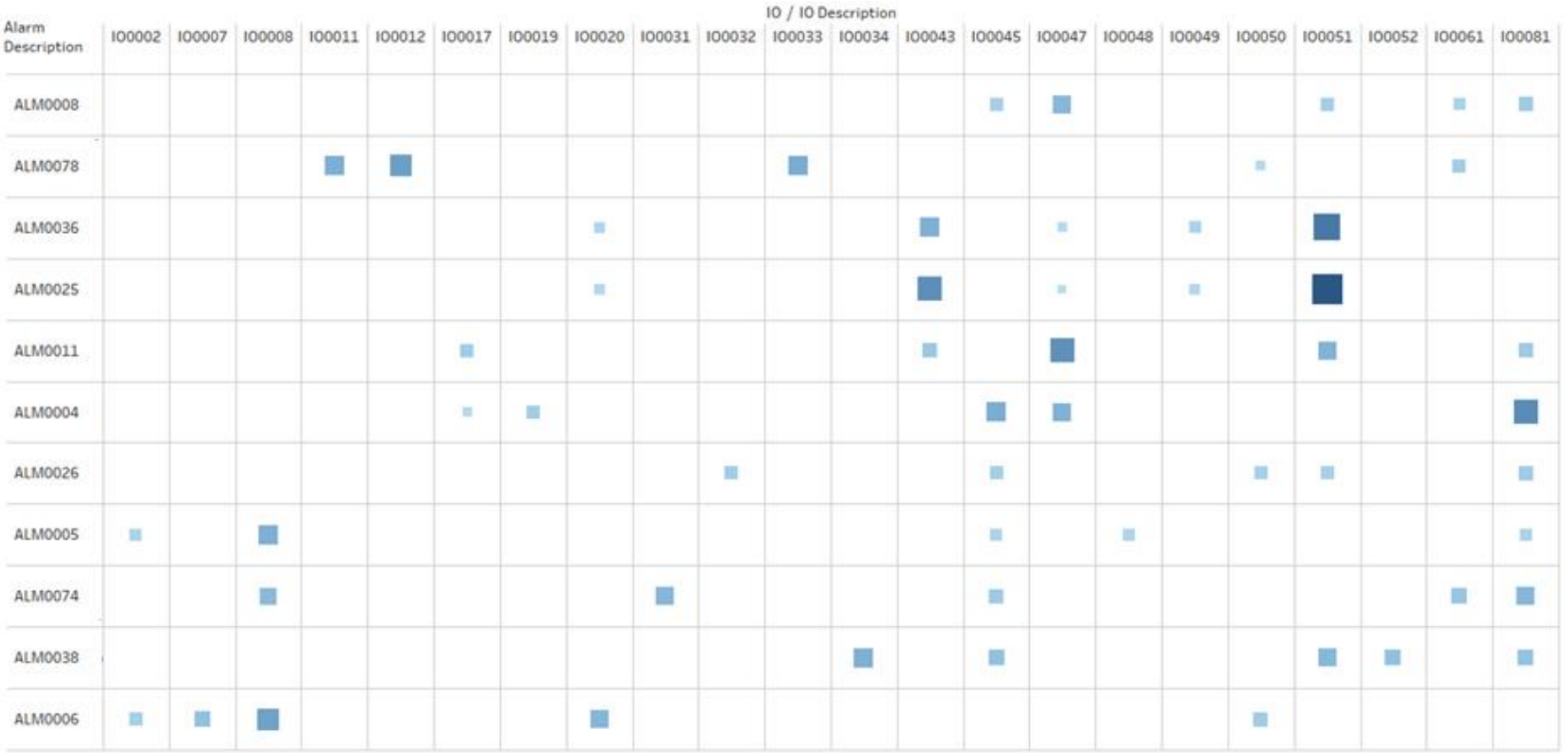


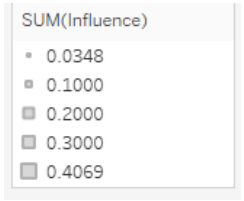
Data security and client access management

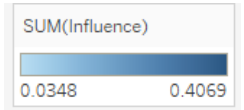
- Kerberos: AF and tag based access rights using RBAC model
- Claims based authentication for PI Vision in Azure B2B for non IHC external users
- Using OSIsoft PI security Audit Tools
- Expose PI Vision to internet through reverse proxy
- Pen testing PI Vision front end

Exploring analytics
Leveraging data into valuable insights

Relating I/O's and alarms using ML

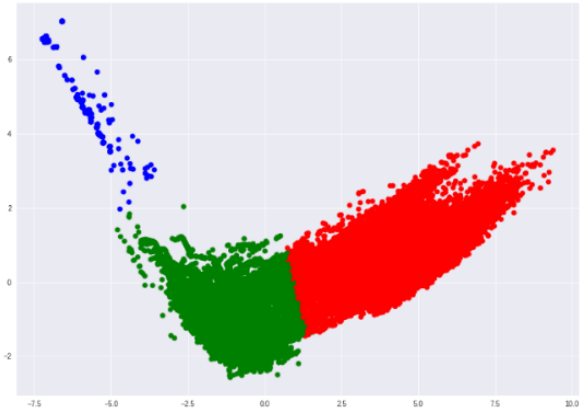


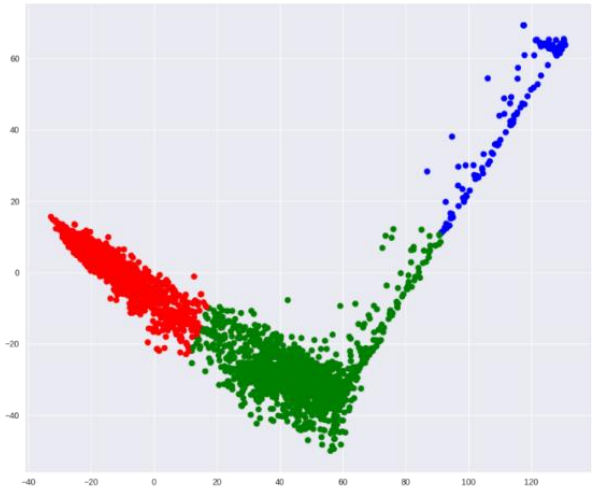




Benchmarking your operational mode

- **Clustering is an iterative process**: we use different time sliding windows (time intervals) and number of clusters and compared the results
- We identified different beaver states over data time period
- We compared sensor outputs over time periods and identified which periods belong to what operation





Pilot & MVP outcomes

- ✓ Use OSIsoft to handle machinery data
- ✓ OSIsoft solution provides quick to market solutions for data visualization and KPI generation
- ✓ OSIsoft provides easy context and management of time-series data
- ✓ Utilize partners to accelerate learning and abilities (market affinity needed)
- ✓ Integrate with Microsoft to store data & expand machine learning possibilities.
- ✓ Hybrid solution possibility and integration with other platforms is a must from chosen partners

IHC's next steps
Towards digitalization of products

Next steps

1. SERVICES

- Real time remote monitoring
- Remote support & consultancy
- Intelligent services

2. ASSETS

- Small cutter dredgers
- Mid/large size dredgers
- Pipelay towers
- Enabling data sharing through PI-to-PI connection for customer

3. ANALYTICS

- Business analytic integrator
- Kafka, Hortonworks Spark
- Use OCS, OMF and edge datastore for lightweight software solutions on board

Know what you want, but do not overthink

- Identify a clear development strategy
- Think **BIG** but start small
- Understand your market and their needs
- Be innovative and ignore the norms
- Research thoroughly and develop clear vendor selection criteria
- Explore more than one vendor
- Carry out pilots (fail and/or succeed fast)


THE TECHNOLOGY
INNOVATOR.

IHC/Rolloos

Fleet wide monitoring solution

CHALLENGE

Connecting remote asset and organize data in a structured and time synchronized manner and enabling creation of providing ad-hoc visualization for remote support and vessel monitoring

- Remote asset with limited data connection
- IO Data quality issues
- No central database without proper tools to access the data
- Data Access for all IHC users

SOLUTION

Real time remote monitoring solution for vessels performance and remote support and troubleshooting for IHC internal and client usage

- 22 vessels connected and streaming real time data to grow to 50 by end of the year
- Fully automated tag configuration, data QC and AF template configuration for onboarding new vessels using , PI AF, PI Vision, Interface for RDBMS, AF transformation tool, Integrator for BI
- Ad-hoc and summary display in PI Vision

RESULTS

Client and IHC access for remote trouble shooting and vessel performance monitoring

- Deployment from pilot to MVP for fast time to value by partnering
- Enabling access to data for support and troubleshooting
- Lightweight solution for gathering customer feedback and rapid iteration cycles

Fleet-Wide Remote Dredging Vessel Monitoring

- Daniel Stoyle
- dg.stoyle@royalihc.com
- Senior Asset Manager
- Royal IHC

- Martijn Handels
- martijn.handels@rolloos.com
- Director Product Development
- Rolloos

Questions?

Please wait for the **microphone**

State your **name & company**

Please rate this session in the mobile app!