What is Predictive AI/IoT
How to achieve this – quickly and cheaply – in your Space

connect data • visualize predictive insights • deliver value

Presented by:
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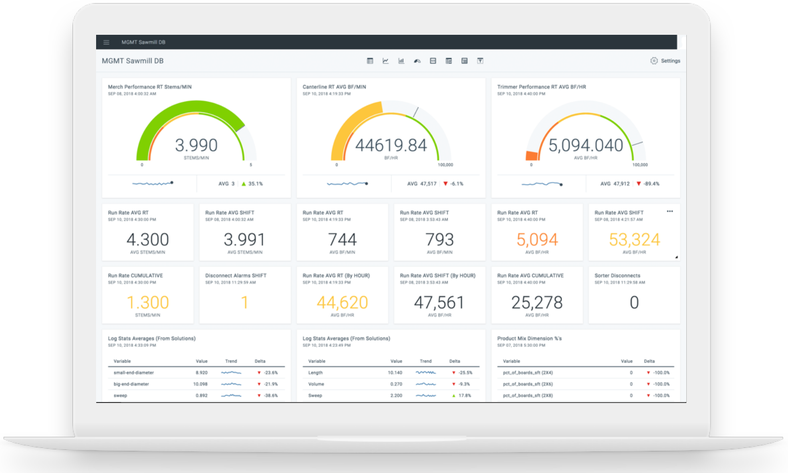
November 28 - Montreal



I tend to ramble – I hope this is not our story together
Please Ask Me Questions

A Partnership Between BID Group and Cumul8

My career evolving from video games to VFX/3D conversion of Hollywood films to finally big data predictions

But realized I was missing the specific knowledge

bid group

INDUSTRY EXPERTISE

With over 30 years of experience in the Forest Products industry, BID Group has the engineering and operational expertise to help you get the most out of your devices, systems, and solutions.

CUMUL8

TECHNOLOGY PLATFORM

Cumul8 brings together the ‘fast to excitement’ and ‘ease of use’ philosophies learned from years of game production with the sheer volume of VFX data for technology to quickly deliver predictive insights and assist human judgement.

OPER8

DIGITAL TRANSFORMATION

The first of its kind and representing a transformative shift for the Forest Products sector, Oper8 is an industry-specific analytics platform combining the industry experience of BID Group and the AI technology of Cumul8.

First what do I mean by AI/IoT

What is a general sense of what it takes to create results

There Will Be Winners and Losers on This Journey

AI/IoT investment will becoming more and more important to your internal/external solutions

AI/IoT is to industrial companies what Henry Ford did to manufacturing
This is what a companies digital transformation will feel like

Before:

Easter morning 1900: 5th Ave, New York City. Spot the automobile.

Source: US National Archives.

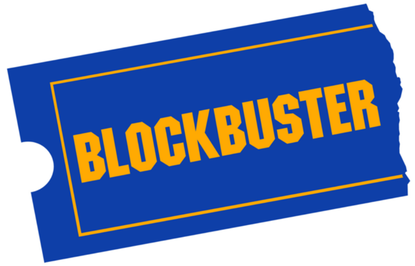
After Ford revolutionized the assembly line:

Easter morning 1913: 5th Ave, New York City. Spot the horse.

Source: George Grantham Bain Collection.

But the transformation is going to happen much faster
In 2004 Netflix barely existed and Blockbuster dominated
By 2011 Blockbuster had declared bankruptcy
Blockbuster did not invest in STREAMING

Before streaming



After streaming

NETFLIX

One just has to get started – to just invest time in the unknown.

Do not have instant expectation of value or preconceived concept of what success looks like

The hype of a Magical AI Future is Paralyzing Companies
It is stopping the investment of a digital transformation

The Big Data Problem

A massive amount of big data is being produced by the rapid expansion of IoT devices and sensors.

The sheer volume of data created by devices and sensors connected to the Internet of Things (IoT) will increase to a mind-boggling level. The challenge is how to reliably store and access the vast live data, which is necessary before any predictions can occur.

How can the deluge of performance data and information generated by these devices be analyzed?

This data holds extremely valuable insight into what is working well and what is not, pointing out conflicts that arise and providing high-value insights into new business risks and opportunities as correlations and associations are made. It is simply impossible for humans to review and understand all the terabytes of machine data.

The skill set necessary to solve these challenges does not reside in most companies.

The problem has moved from understanding the definition and value of IoT and artificial intelligence to the tactical. In other words, HOW TO MAKE IT WORK.

AI is a prediction tool.

Prediction is using information you have to generate information you don't have.

The current generation of AI is a long way from the intelligent machines of science fiction.

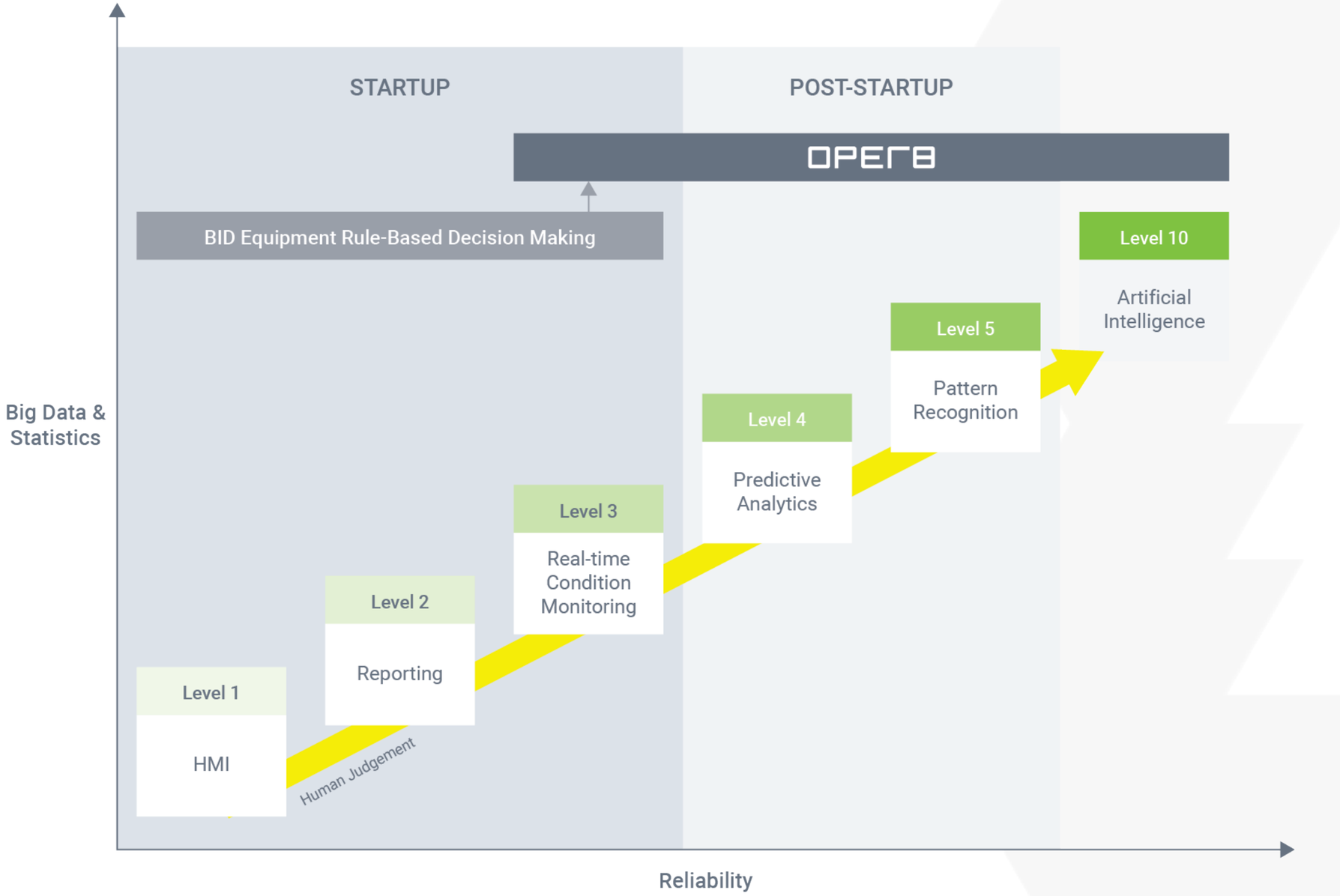
Prediction is intelligence – getting useful information faster to allow for insight.

AI predictions enhance human judgement.

Ajay Agrawal
World-renowned expert in the business of AI

Economic AI vs. Science Fiction AI Model

The AI Journey



How Big Data Platform Components Work Together

1

Connect Data

The challenge to getting value from data is the ability to collect, clean, and store vast amounts of disparate data. Oper8 does this in one cloud-based platform.

2

Sentinel – Deliver AI

Sentinel is the data science layer overseeing all data collected in Oper8 and provides insights through tools such as projections and prediction models.

3

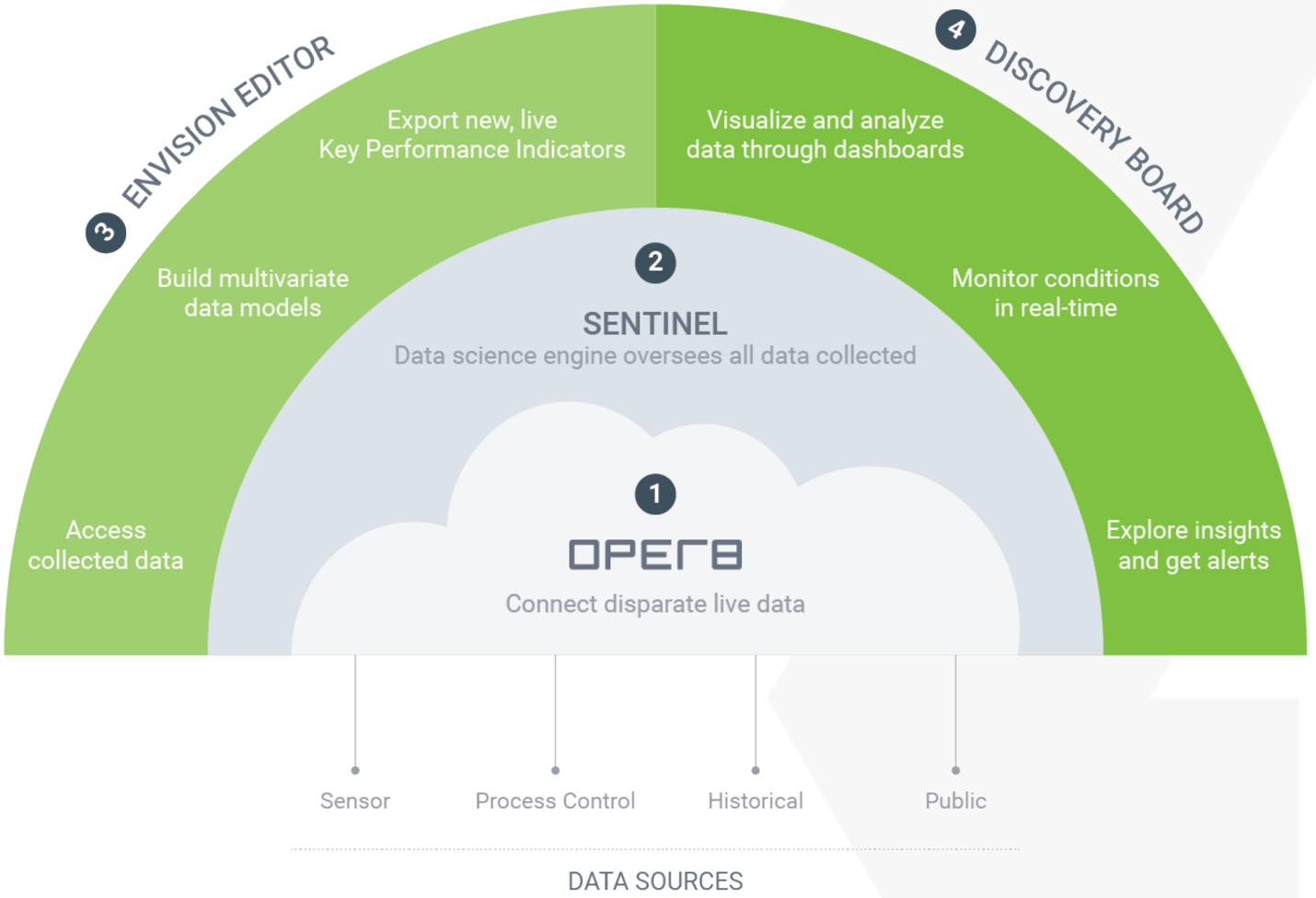
Envision Editor – Novices feel like data scientists

The Envision Editor allows users to transform data into something useful without having to hire coders. Data models using disparate sources are easily created for export as new KPIs.

4

Discovery Board – Visualize and explore data

The Discovery Board provides the full flexibility to visually explore real-time and historical data through easy-to-create dashboards, as well as scheduled reports, alerts, and event logs.

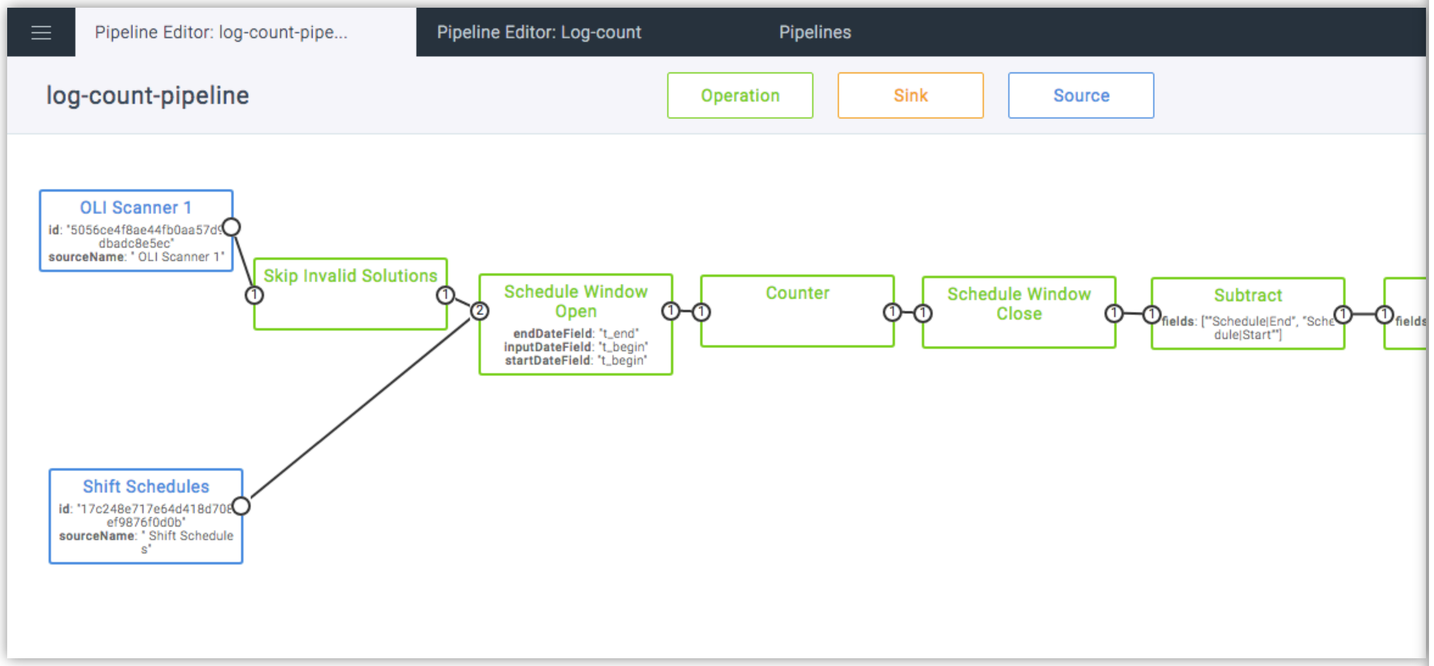


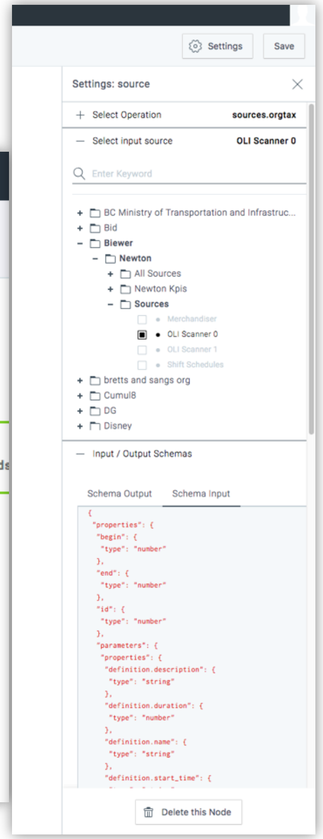
Unique and easy method for Achievable AI to show value quickly

Envision Editor

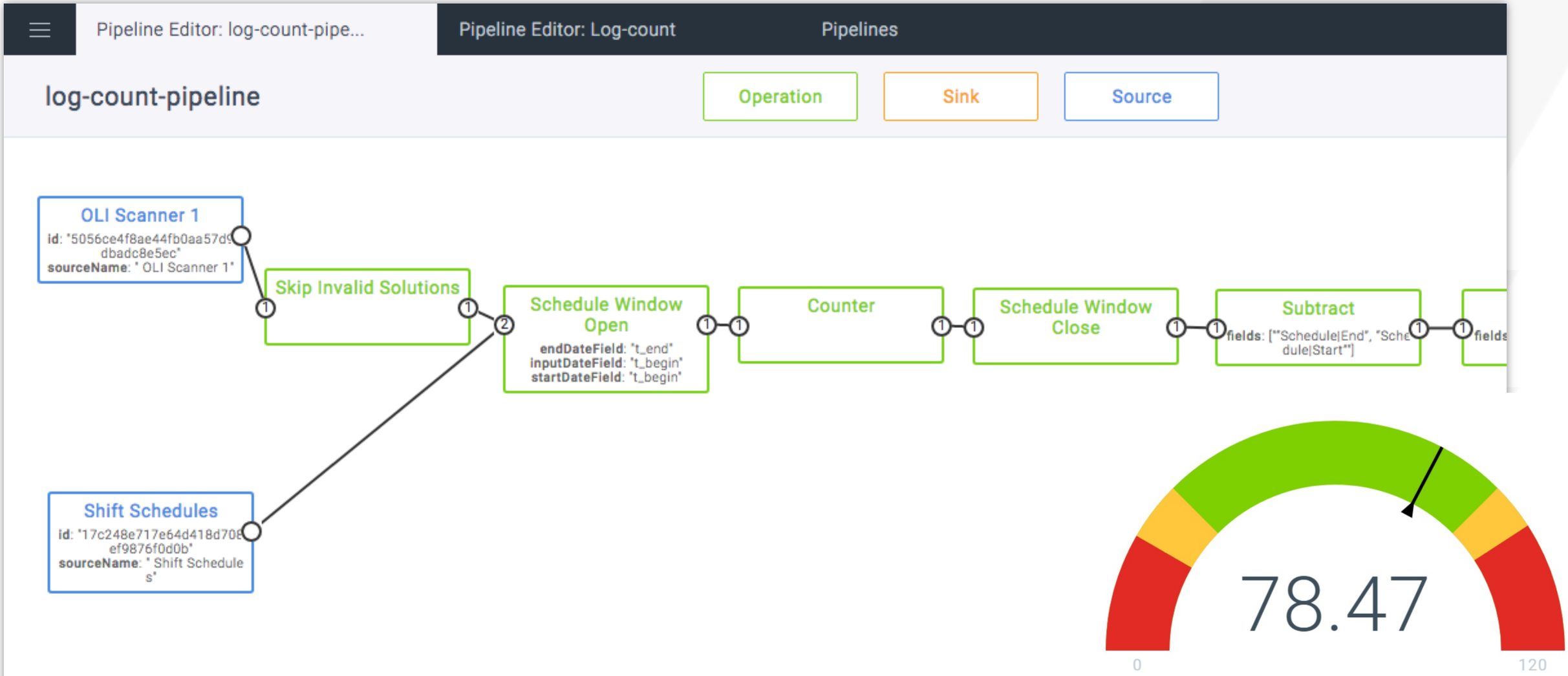
The Secret Sauce – Envision Editor Patent Application Filed

- Node-based editor allows existing live data to be used for building models and creating new KPIs for analysis
- The process for creating these models is simplified for non-programmers
- Puts the power of creating predictive models into the hands of those with industry knowledge and are now only limited by their imagination



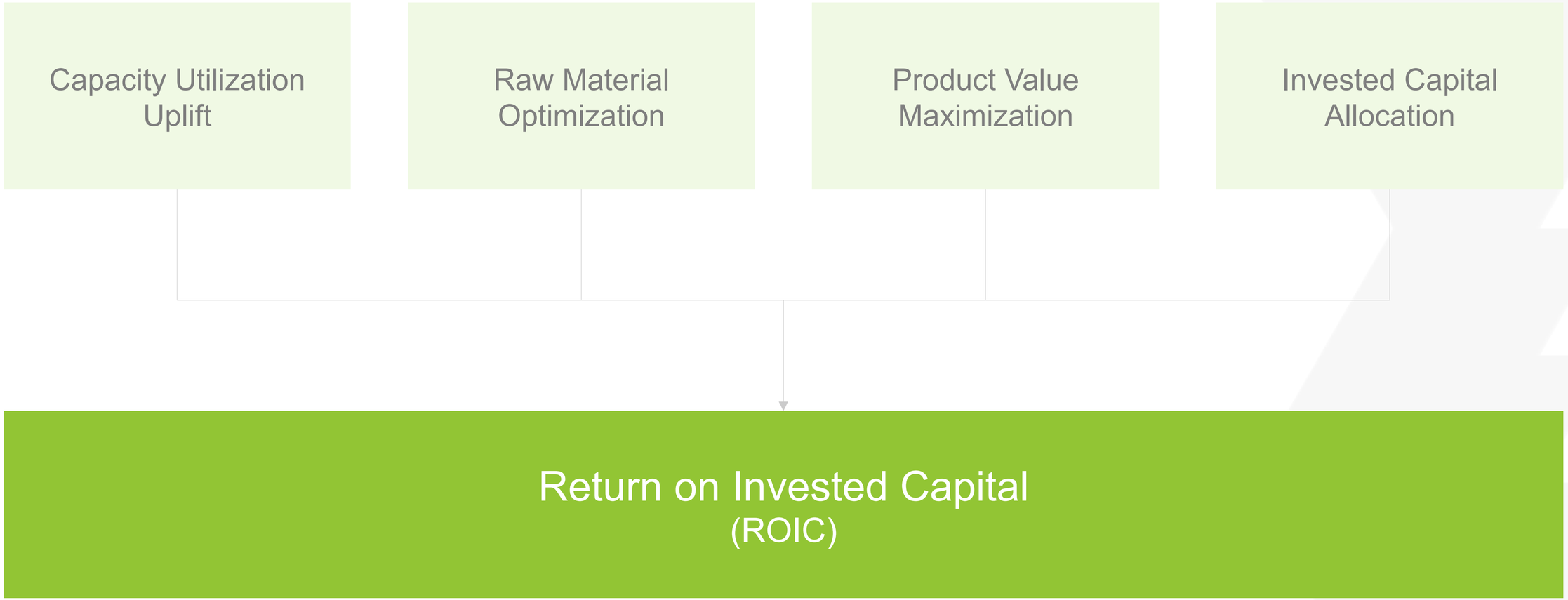


Prediction is an insight based on connecting live data - together



With Data in One Spot – Now it is Possible to Imagine The Value Based KPI's

The goal of this "Big Data/AI" Thing – is a Value-Driven Approach



Determining Gradex skip downgrade cause

Example 1

One of many insights from a fully connected turnkey mill

Over the last 50 boards, count the number of boards that were downgraded due to skip (specific planer machine output that ‘scratches’ the boards) and show it as a percentage

Sawmill - Production (CU)	
BF (Trimmer)	18,199
BF/HR	1,941
LRF T/O (BF/ft³)	8.9

Sawmill - Piece Count	Total Count
Merch - Stems	183
OLI - Logs	369
Trim - Boards	1,630
Stacker - Packs	3

Uptime % Summary	
Merchandizer	5
OLI	3
TBL	3
Trimmer	4
Stacker	E-1

Trimloss (%)	Slash Nom Vol. (%)	Slash Bds
2.6	0.2	6

	Merch (stems)	OLI (Logs)	Trimmer (Bds)
Pieces/Min	0.3	0.7	3
Speed chain Dis	44	26	8
Avg Gap/LugFill	114.7	20.3	43

Physical info	
BF/Board	11.2
Avg Diameter	8.0
Avg Length	16.4

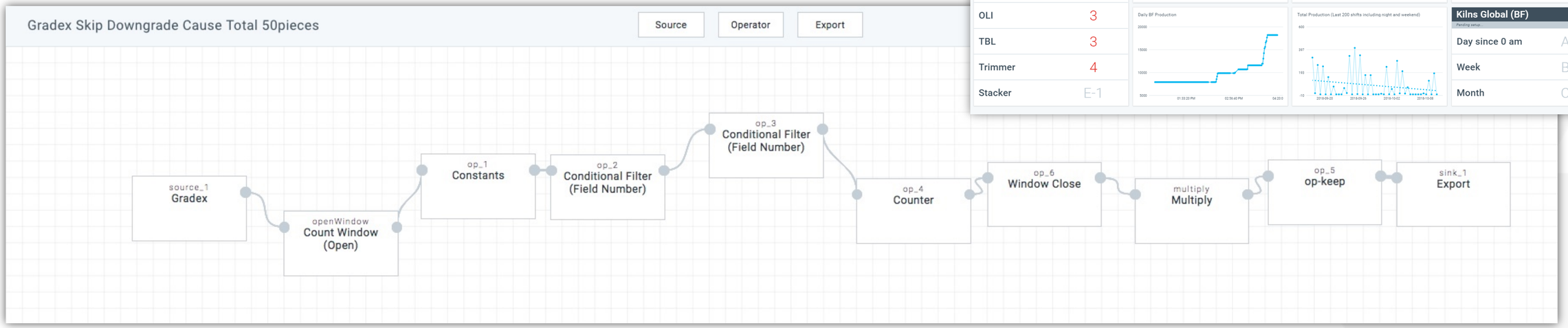
Green Sorter	
% 2x4	31.6
% 2x6	18.8
% 2x8	1.0

Bins Available	Bins Full	Bds Reject Bin
25	1	80

Stacker Info	
Bundles/HR	12
Tiers/Min	2
Cycle Time (m)	C-1

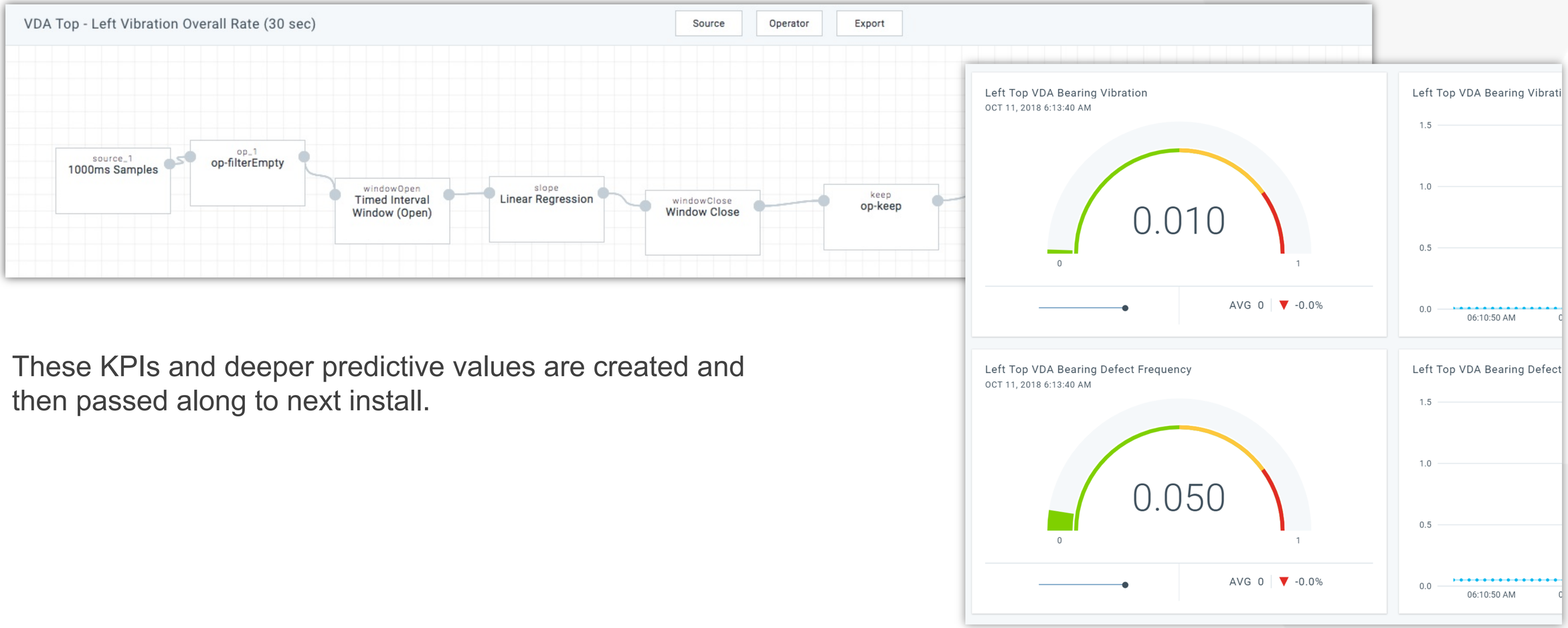
Sawmill - Speed Info - 10 Min	Boards/Min
Merch	61
OLI	0
Trimmer	0
Stacker	D-1

Kilns Global (BF)	
Day since 0 am	A-1
Week	B-1
Month	C-1



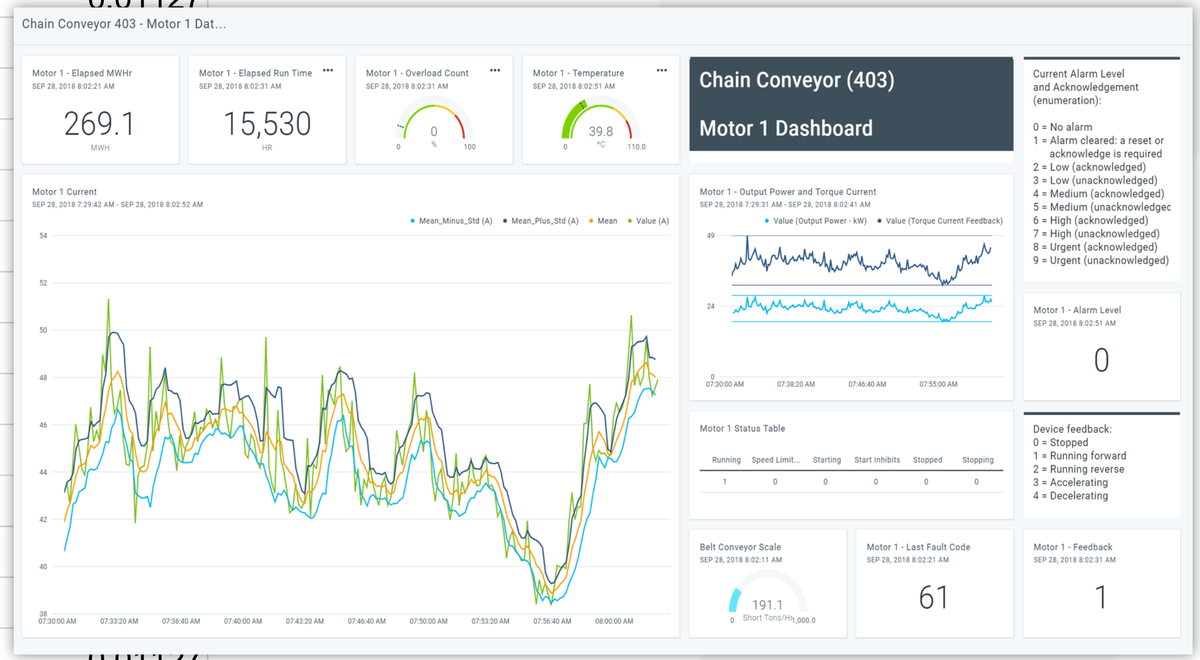
Determining overall rate of vibration over the last 30 seconds

Example 2 – this mill was really having bearing challenges



These KPIs and deeper predictive values are created and then passed along to next install.

	Right_VDAE_3rd_Arb	Right_VDAE_Top	Right_VDAE_Top	Right_VDAE_3rd_	Right_VDAE_Btm
15:00:00	0.0755906	0.487008	0.01121	0.01366	0.01127
15:00:01	0.0755906	0.487008	0.01121	0.01366	0.01127
15:00:02	0.0755906	0.487008	0.01121	0.01366	0.01127
15:00:03	0.0751968	0.487008	0.01121	0.01366	0.01127
15:00:04	0.0751968	0.487008	0.01121	0.01366	0.01127
15:00:05	0.0751968	0.487008	0.01121	0.01366	
15:00:06	0.0751968	0.487008	0.01121	0.01367	
15:00:07	0.0751968	0.487008	0.01121	0.01367	
15:00:08	0.0751968	0.487008	0.01121	0.01367	
15:00:09	0.0751968	0.487008	0.01121	0.01367	
15:00:10	0.0751968	0.487008	0.01121	0.01367	
15:00:11	0.0751968	0.487008	0.01121	0.01367	
15:00:12	0.0751968	0.487008	0.01121	0.01367	
15:00:13	0.0751968	0.487008	0.01121	0.01367	
15:00:14	0.0751968	0.487008	0.01121	0.01367	
15:00:15	0.0751968	0.487008	0.01121	0.01366	
15:00:16	0.0751968	0.487008	0.01121	0.01366	
15:00:17	0.0751968	0.487008	0.01121	0.01366	0.01127
15:00:18	0.0751968	0.487008	0.01121	0.01366	0.01127
15:00:19	0.0751968	0.487008	0.01121	0.01366	0.01127
15:00:20	0.0751968	0.487008	0.01121	0.01366	0.01127
15:00:21	0.0751968	0.487008	0.01121	0.01366	0.01127
15:00:22	0.0751968	0.487008	0.01121	0.01366	0.01127
15:00:23	0.0751968	0.487008	0.01121	0.01367	0.01127
15:00:24	0.0751968	0.487008	0.01121	0.01367	0.01127



Pellet producer looking for chain prediction

Example 3

Project Description

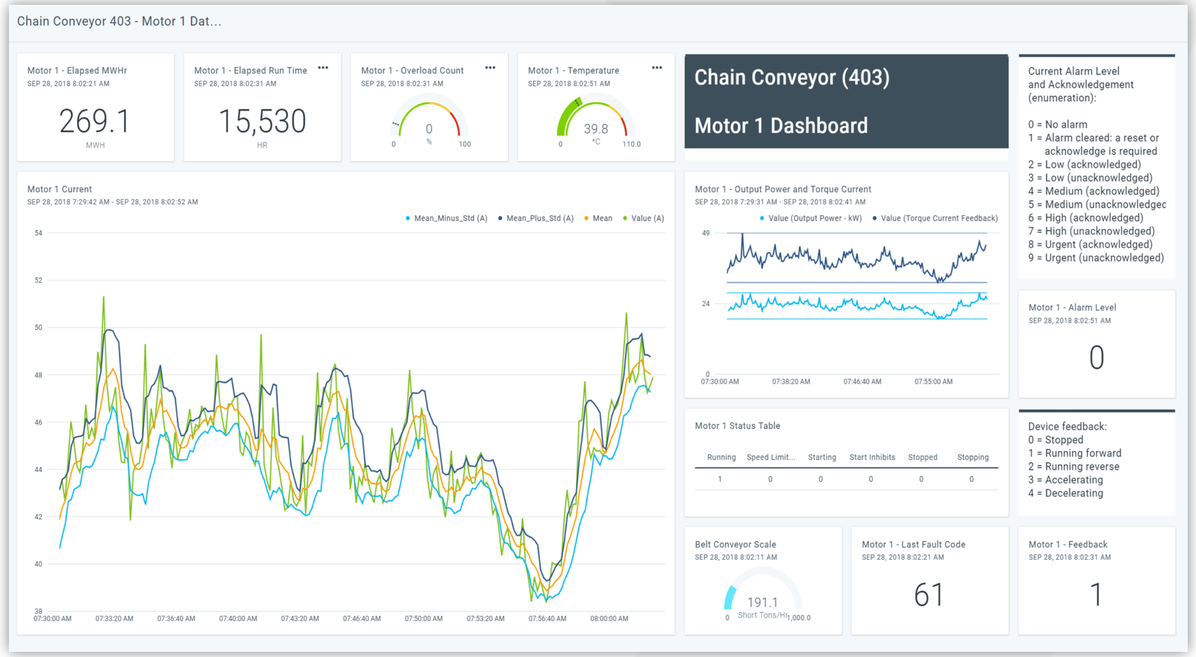
The company produces wood pellets, which are used for biomass energy. As a 24/7/365 operation, any downtime has a significant impact on revenue. Their equipment is currently monitored at an individual machine level, but they would like a more holistic way to predict and prevent downtime.

Cumul8 Implementation

To alert operational personnel to take preemptive action, the company required the prediction of conditions leading to a critical conveyor malfunction that results in an average of 16 hours of downtime per quarter. Cumul8 was able to retrofit an existing facility by connecting to multiple existing data sources, building models, and creating dashboards within two-weeks.

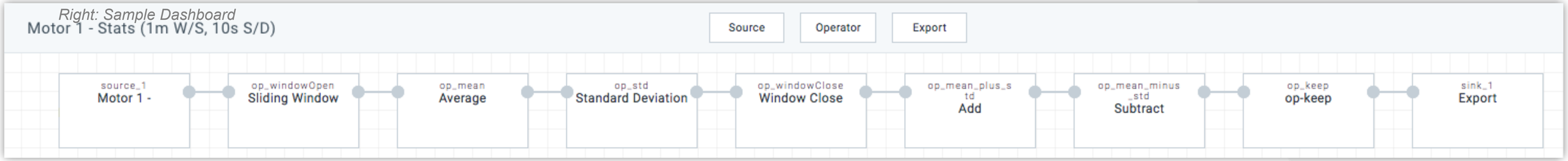
Customer Savings Example

The company has the potential to significantly save on costs with Cumul8 deployed across all seven of their facilities. Savings of over $3.5 million due to lost production and maintenance costs would not be possible without the predictive capabilities of the Cumul8 platform.



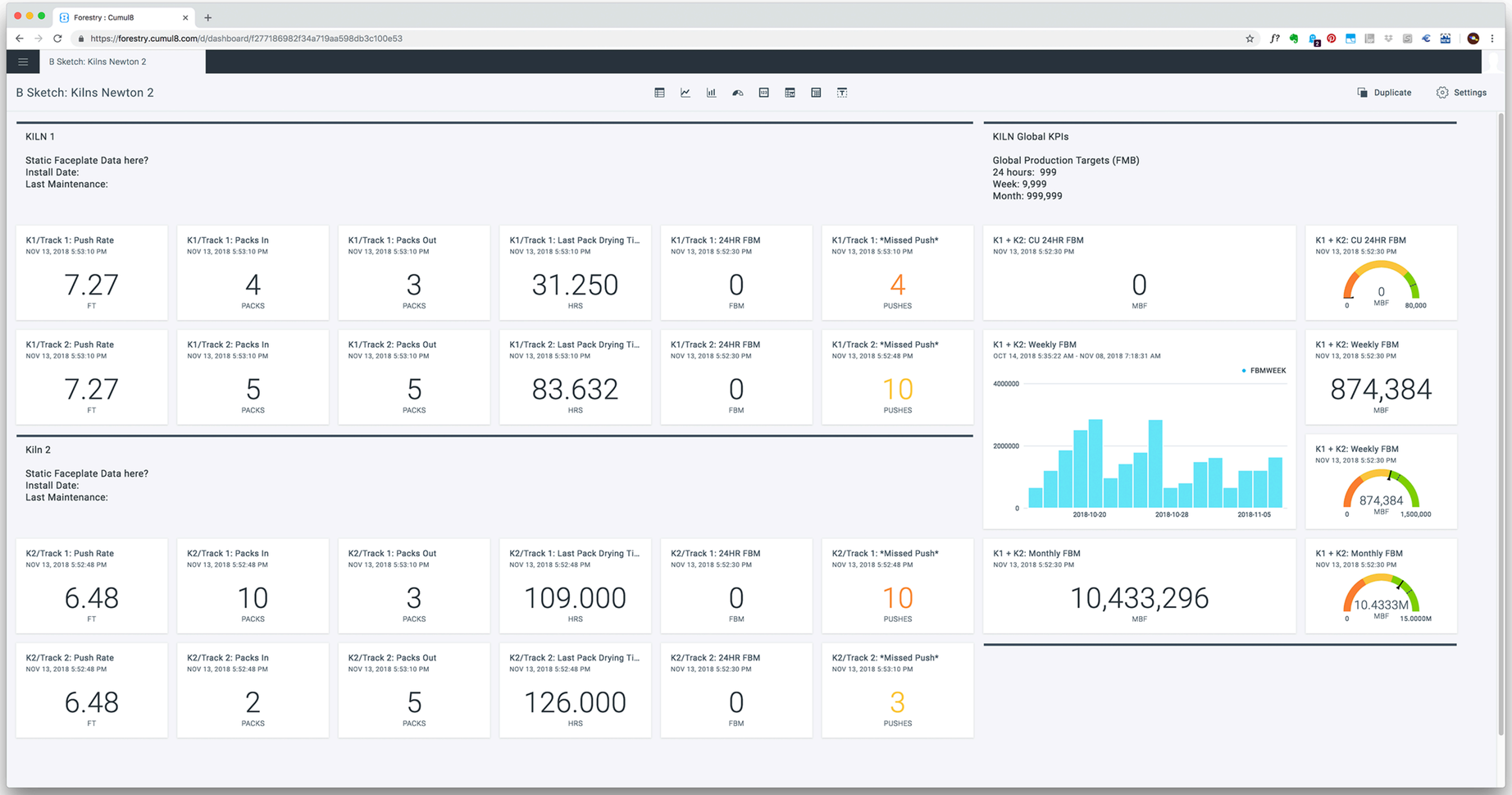
Below: Sample Data Pipeline

Right: Sample Dashboard



The evolution to kiln production and asset health

Example 4



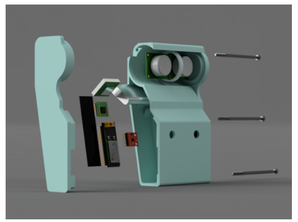
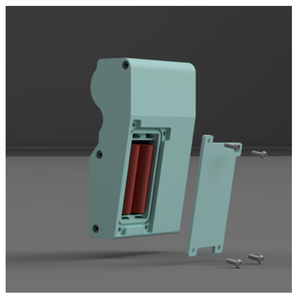
IoT is something allows us all to move quickly to expand insight

Combined IIoT hardware and software solution developed by Cumul8 for open residual/waste bins

- Using data, increase efficiencies and better manage costs related to waste disposal
- Similar solutions do not yet exist
- Sonic sensor hardware connected to Oper8 platform detects when a bin is getting full
- Cellular and wi-fi connectivity





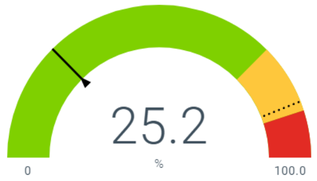



IoT Example – Sonic Sensor in a Dumpster

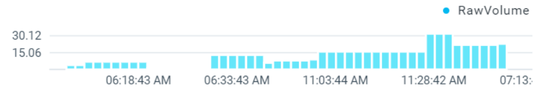
PEAK BIN 942 001

Bin Condition

BIN 942: Fill Percentage
DEC 18, 2016 7:13:43 AM



Sensor 1A Readings
DEC 18, 2016 10:13:44 AM - DEC 18, 2016 7:13:43 AM



Sensor 2A Readings
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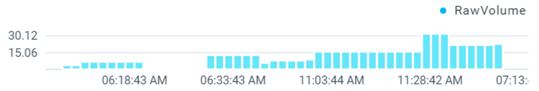
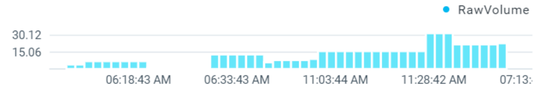


Location: Lat/Lng/Alt
MAY 18, 2015 12:15:00 PM

Variable	Value
LinkID	782,989,950
start	-18T19:00:00Z
end	-18T19:15:00Z

Sensor 1B Readings
DEC 18, 2016 10:13:44 AM - DEC 18, 2016 7:13:43 AM



Sensor 2B Readings
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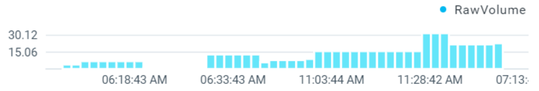


GPS Fix Strength
DEC 18, 2016 7:13:43 AM

Last Upload
MAY 27, 2015 12:25:04 AM

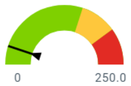
2015-05-27T07:24:00Z

Next Scheduled Upload
MAY 18, 2015 12:15:00 PM

5.00

Sensor 1 Health

Battery Percentage
DEC 18, 2016 7:13:43 AM



Time in Sleep
MAY 18, 2015 12:15:00 PM

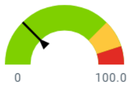
5.00

Battery Change Date
MAY 18, 2015 12:15:00 PM

5.00

Sensor 2 Health

Battery Percentage
DEC 18, 2016 7:13:43 AM



Time in Sleep
MAY 18, 2015 12:15:00 PM

5.00

Battery Change Date
MAY 18, 2015 12:15:00 PM

5.00

Spacer

Just Some Quick Examples to get the Ideas flowing

They key point is that you can delivery your knowledge in complete solutions

Get away from long, consultations

Pick your TOP 5 and then imagine the solution

It is not just about new – value comes in taking RETRO locations and making them feel new

Blending IoT/AI/Middleware to bring fast value

It is about quick to value

From the imagination time to execution

- Taking away the problem of collection and visual value
- thinking of an IoT solution is rather easy

UBIQUITOUS – EASY - AFFORDABLE

Thank You

Questions?