ARUNDO

Smarter Operations Through Industrial Analytics

"UNLOCKING THE VALUE OF DATA"

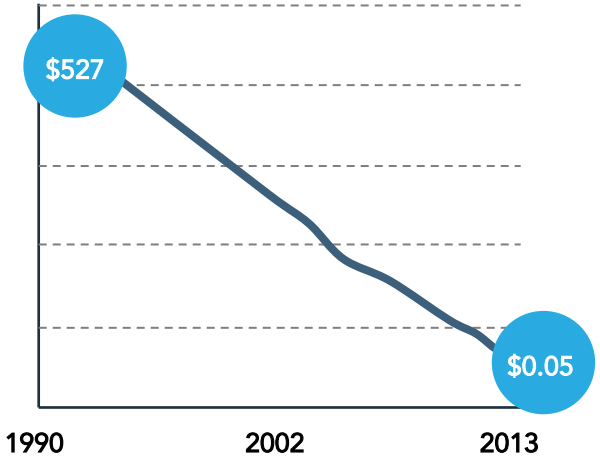
August 2018

Agenda

- Why now
- Case examples - Unlocking the value of data
- Implications
- How the CFO and Finance organizations can have impact

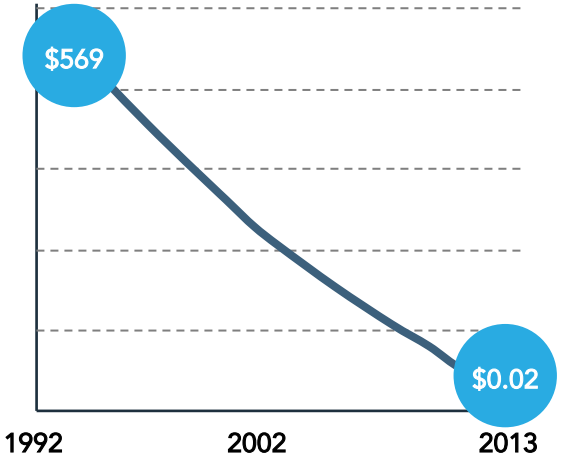
Reduction in compute, storage and communication costs

Global compute cost trends
USD per 1 MM transistors



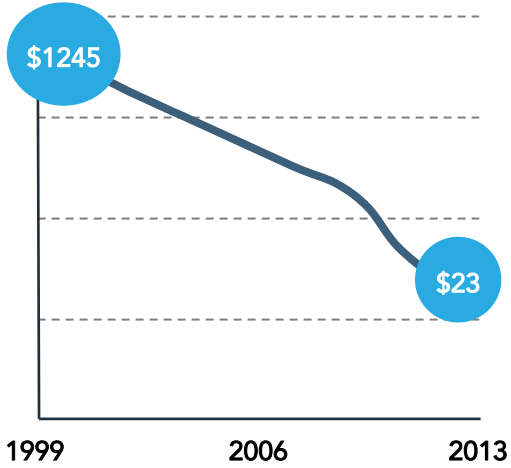
Compute cost declining
33% annually, 1990-2013

Global storage cost trends
USD per gigabyte



Storage cost declining
38% annually, 1992-2013

Bandwidth cost-performance
USD per 1,000 Mbps



Bandwidth cost declining
25% annually, 1999-2013

Source: Deloitte Center for the Edge

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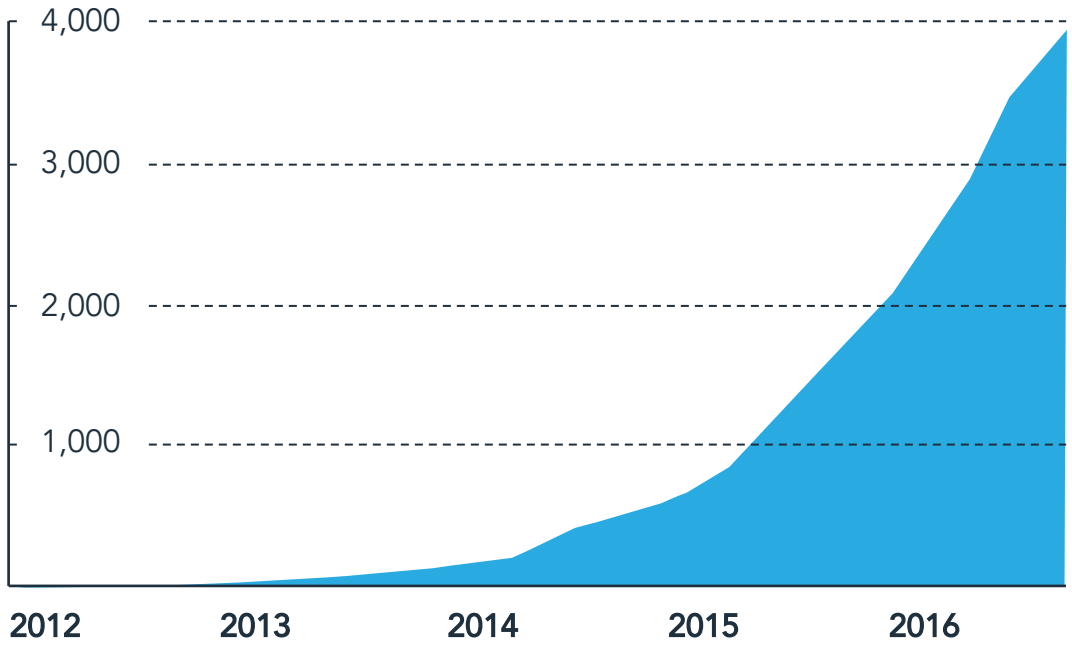
Machine Learning / Artificial Intelligence increasingly applied to large datasets

Growing use of deep learning at Google

of directories containing model description files



Source: Google

Across many products / areas

- Android
- Apps
- Drug discovery
- Gmail
- Image understanding
- Maps
- Natural language
- Understanding
- Photos
- Robotics research
- Speech
- Translation
- YouTube

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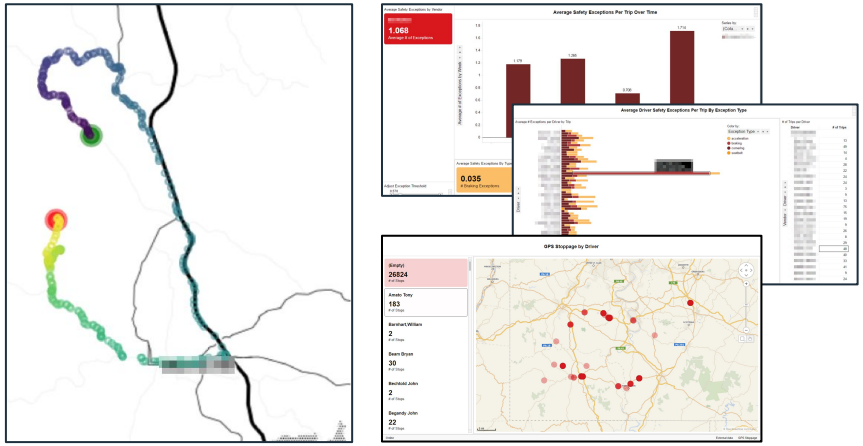
Financial Control and Logistics Optimization for Onshore Operator

OIL & GAS



CUSTOMER'S CHALLENGE

- How to support professionalization of "water-hauling" function with digital tools that allowed the business to improve decision-making
- No way to validate physical flow of water matched financial flow of vendor billings

SOLUTION

- Ingested a combination of data, including GPS data streaming from haulers, customer cost & invoice data, and bill of lading (BOL) from mobile app
- Developed analytical algorithms and insights for data blending, trip definition, and record matching; created transparency around vendor performance and safety

IMPACT

Individual and vendor-level transparency

99%+ matching of physical trips to financial flows

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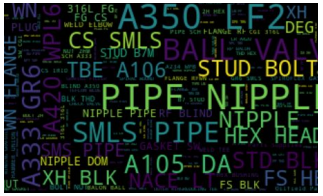
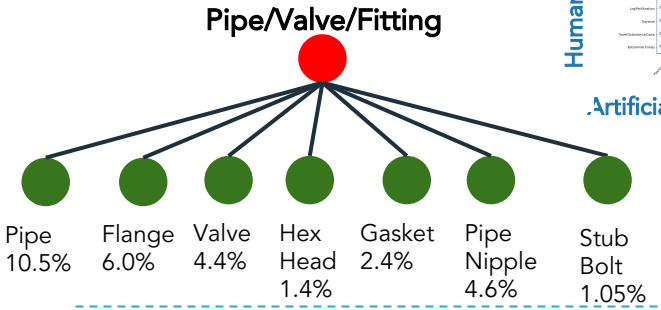
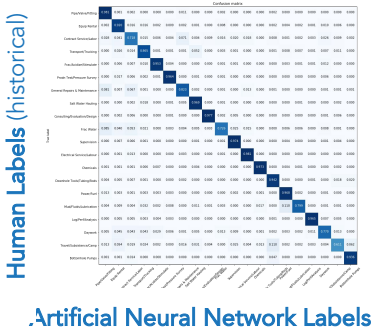
Application of Machine Learning to Procurement Spend for Onshore Operator

OIL & GAS







IMPACT

- Improve spend analysis for negotiations
- Dramatic reduction in coding costs

CUSTOMER'S CHALLENGE

- Substantially improve spend analysis insight through deeper categorization of spend (e.g. expand to 1,000+ categories)
- Reduce coding costs; and push to line-level detail

SOLUTION

- Train a neural network to recognize the appropriate classifications for spend categories
- Apply the neural network to spend data dramatically:
  - Reducing cost
  - Improving throughput
  - Create foundation for improved negotations

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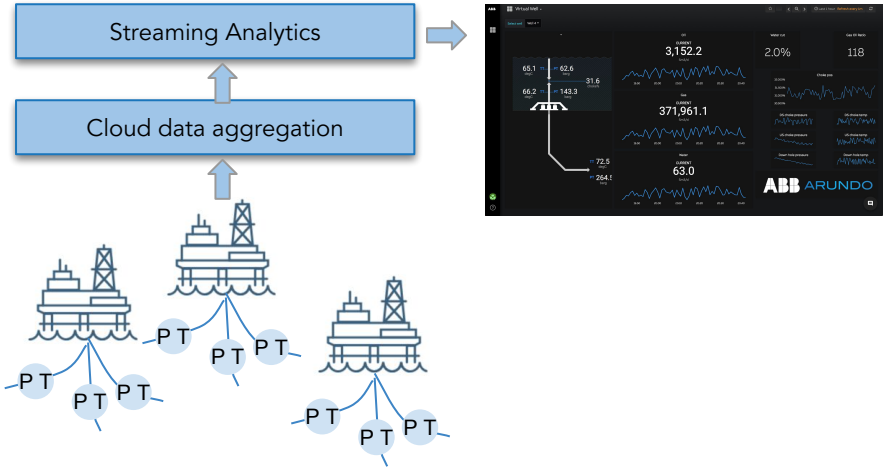
Shift CAPEX outlay to substantially lower OPEX



CUSTOMER'S CHALLENGE

- Need to substantially lower cost of CAPEX outlay for physical multi-phase flow meters on wells (measure mixture of oil, water and gas)
- Nice to have: Improved transparency and option to put same capability into lower volumen wells

SOLUTION

- Deploy a cloud-based "virtual" flow meter incorporating temperature, pressure and flow measurements
- Provide real-time cloud-based access to central view of all wells for individual well and field optimization

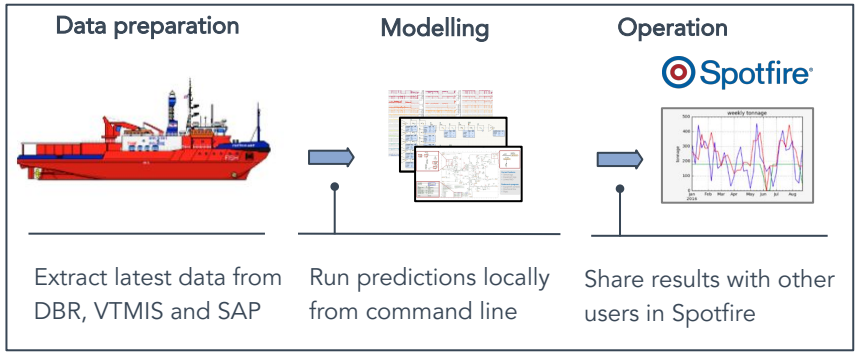
IMPACT

Expand use of multi-phase flow meters across assets

Cut $250K+ per well CAPEX to substantially lower OPEX

Supply Chain Forecasting for Offshore Operator

OIL & GAS



CUSTOMER'S CHALLENGE

- Low predictability of short to medium demand of drilling equipment
- Unexpected peaks in the demand of drilling equipment is managed by buying expensive additional vessel capacity in the spot market

SOLUTION

- Deployed a machine learning model by combining data from multiple sources to understand the need for drilling equipment
- Based on an supervised learning approach to learn the relationship between the drilling plans and the actual shipped tonnage of drilling equipment to the rigs

IMPACT

Reduced rates by 5% for 30% of fleet (short-term contracts)

Reduced idle long-term chartered vessels by 20 vessel days

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Compressor Failure Detection for Upstream Operator

OIL & GAS

IMPACT

300-370 kboe
reduced production loss
(single identified failure)

USD 12-16 M
annual value

CUSTOMER'S CHALLENGE

- Failures on compressors are low-frequency events with high-impact consequences; control systems not able to capture compressor status/prevent failures on their own
- A single failure can cause production loss costing tens of millions of USD

SOLUTION

- Deployed a cloud-based machine learning system to provide early warning of abnormal compressor behavior
- The system raised an alert two weeks in advance and also identified the most anomalous sensors of the compressor

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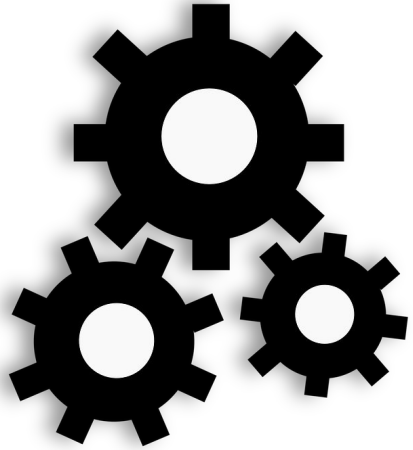
Implications for Finance



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How the CFO and Finance organization can have impact

Force a focus on outcomes, not science projects (90 days to value)

Manage investments within a portfolio

Bring a "lean" mindset, get started now, then rapidly prune marginal/ failing cases

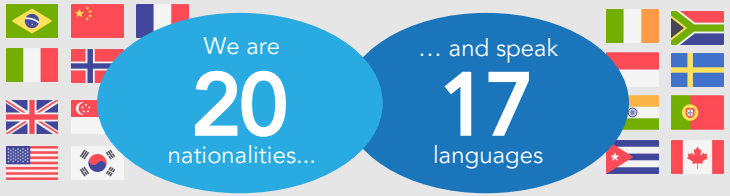
Bring clarity to who owns the data (HINT: it's the company, not an individual)

Bring clarity to who owns the result (HINT: the business, not data science)

Arundo Software is purpose built to solve industrial IoT/ analytic problems

Key facts

- Founded in 2015 – now 100 "Arundites" (21 PhDs)
- Bringing "Silicon Valley" into asset-heavy industries
- Providing industrial cloud software to enable rapid value from machine learning models at scale



Our employees have a deep and diverse set of backgrounds and experiences:

ARUNDO

HOUSTON | OSLO | PALO ALTO

Arundo - What we are

"A software company providing a platform and applications to industrial companies who want to rapidly transform business operations at scale using machine learning and IoT data"

- We do secure, live data ✔
- We integrate data science into industrial operations ✔
- We ensure that your employees can make informed decisions ✔
- Less than 90 days from data to value ✔


Oil & Gas


Maritime


OEM



Power & Utilities Manufacturing

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