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# **BUREAU VERITAS COMMODITIES**

**ARTIFICIAL INTELLIGENCE TRANSFORMS OIL ANALYSIS:  
A CASE STUDY OF PREDICTIVE ANALYTICS**

**| SAM FISHER & SALMA HOUMYIMID**

# Speakers



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Global Director  
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**Microsoft**

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Data Science Consultant  
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# Agenda

- ▶ An analogy for digital innovation opportunities
- ▶ The Challenge
- ▶ The Concept
- ▶ The Goal
- ▶ The Technical Solution (Microsoft)
- ▶ New Challenges

# Digital Gold Rush



# The challenge

- ▶ Processing >1M samples/year with 15 Data Analysts
- ▶ Scaling from 4 labs to 17 labs in 4 years
- ▶ Driven by focus on three core values:



**INSIGHTFUL**



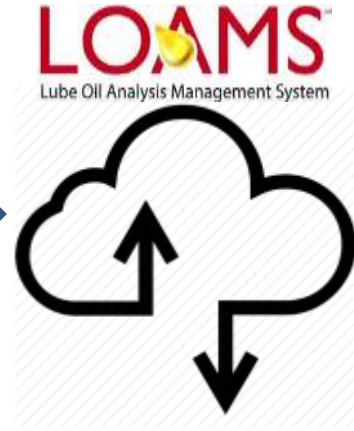
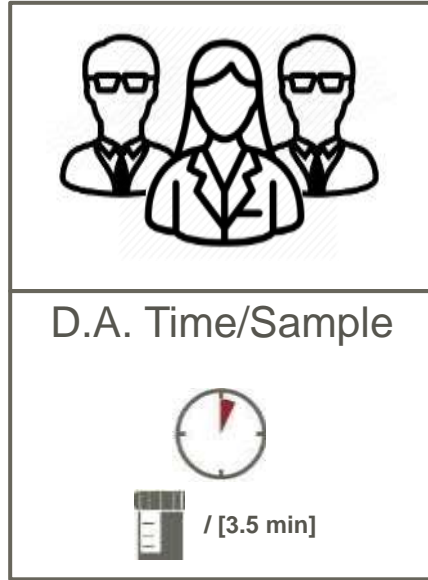
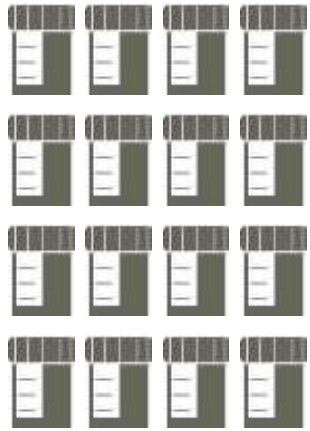
**ACTIONABLE**



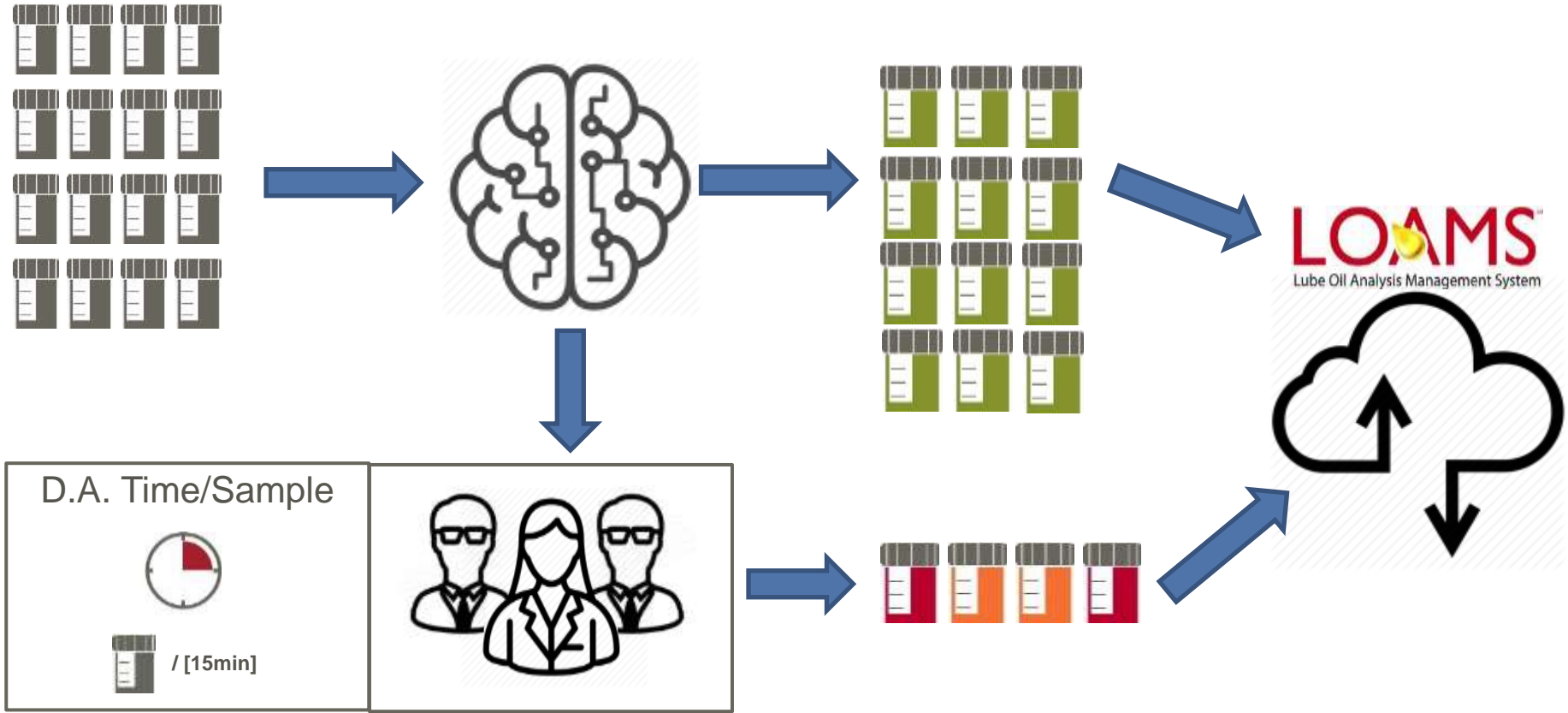
**PERSONABLE**



# The Past



# The Future



# Goals



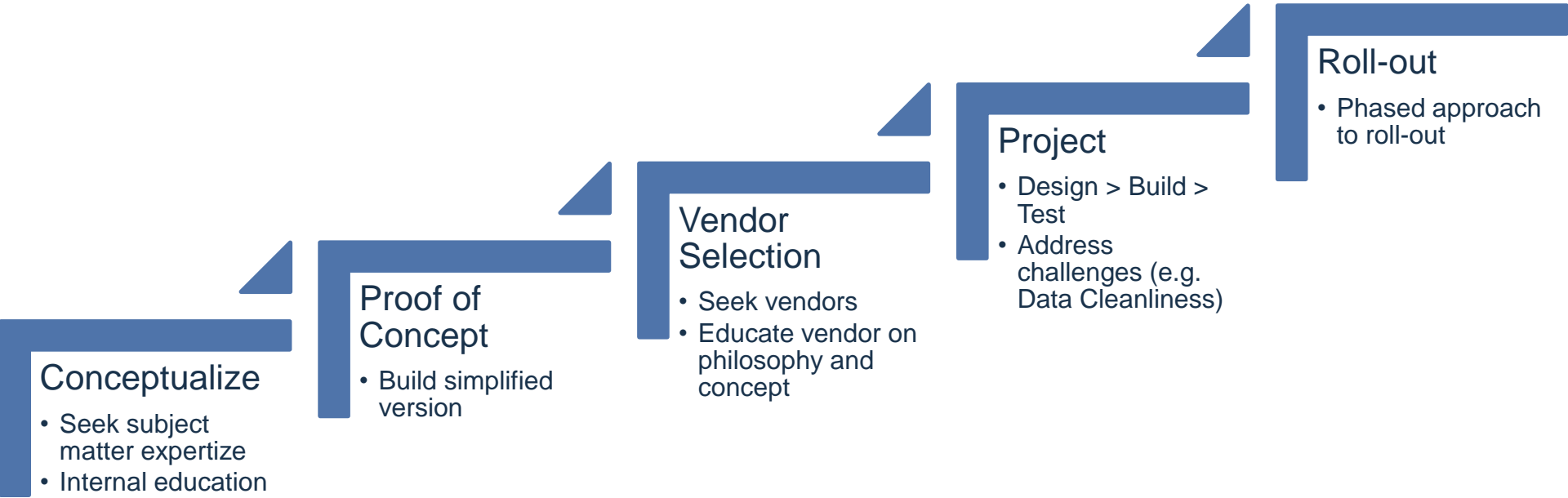
**01 EFFICIENCY** ability to process more samples and focus on the critical samples

**02 CONSISTENCY** ability to provide uniform comments, result flagging, and sample severities across all labs

**03 ELEVATED RECOMMENDATIONS** ability to provide critical insights on critical samples of interest



# Project Phasing





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# Microsoft Machine Learning & Artificial Intelligence

## ▶ What is ML ?

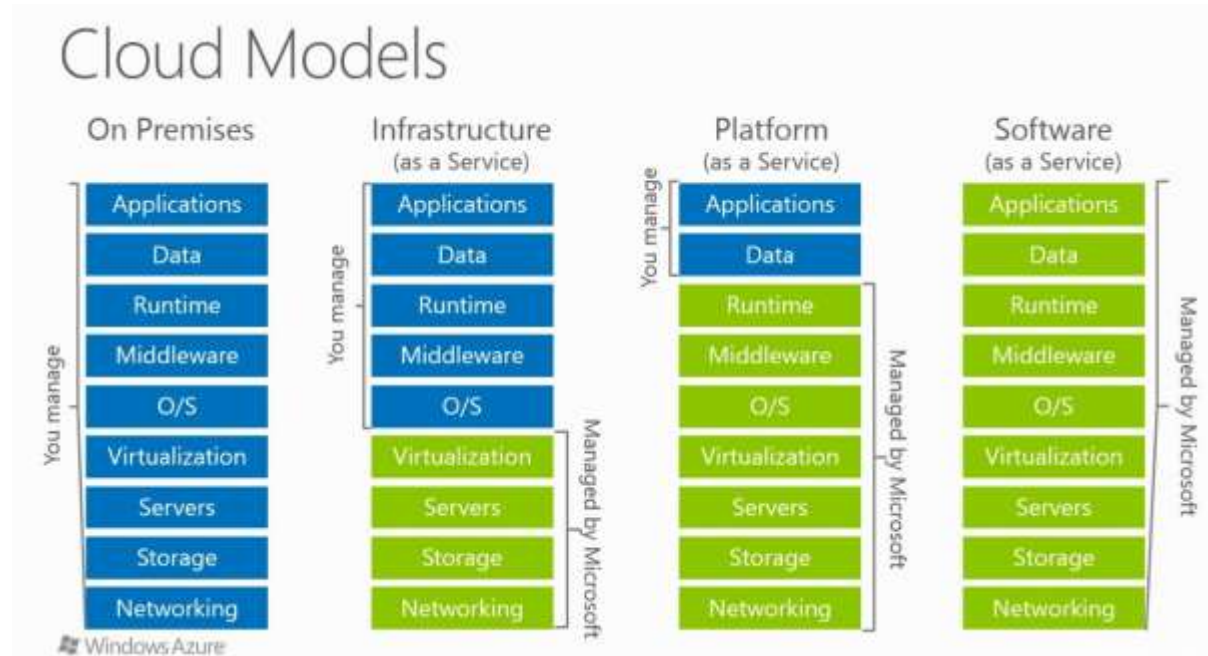
- *“Machine Learning is the science of getting computers to learn and act like humans do, and improve their learning over time in autonomous fashion, by feeding them data and information in the form of observations and real-world interactions”*

## ▶ Why use Machine Learning

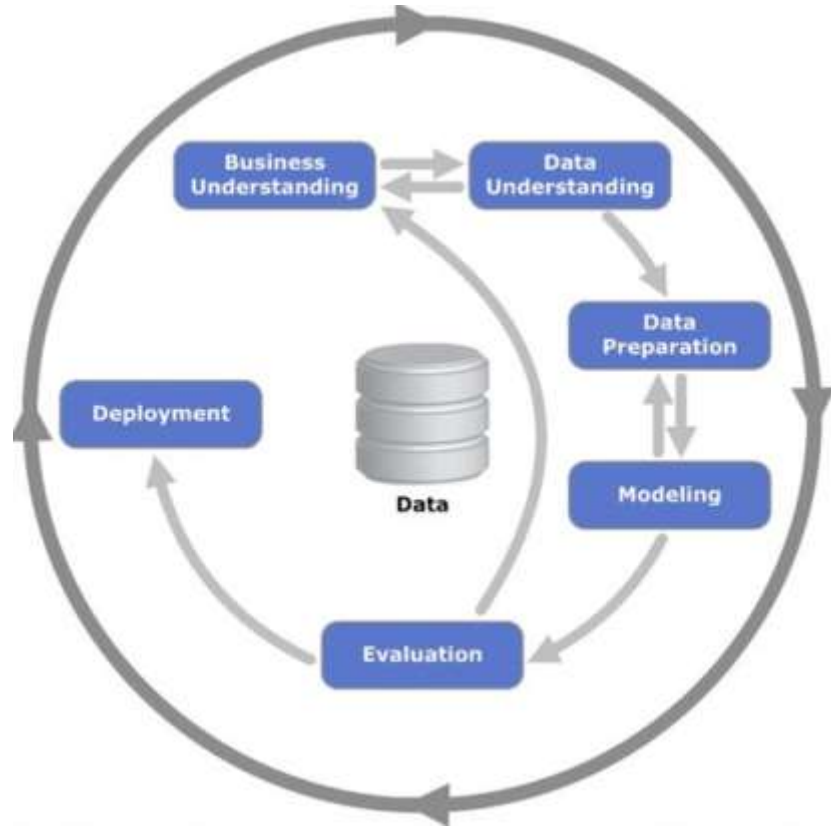
- It can help us on daily basis
- Needed for tasks that are too complex for humans to code directly
- We can use it to analyze data in a more complex way
- With cloud computing available, we can use it for automating highly complex calculations

# Why Microsoft

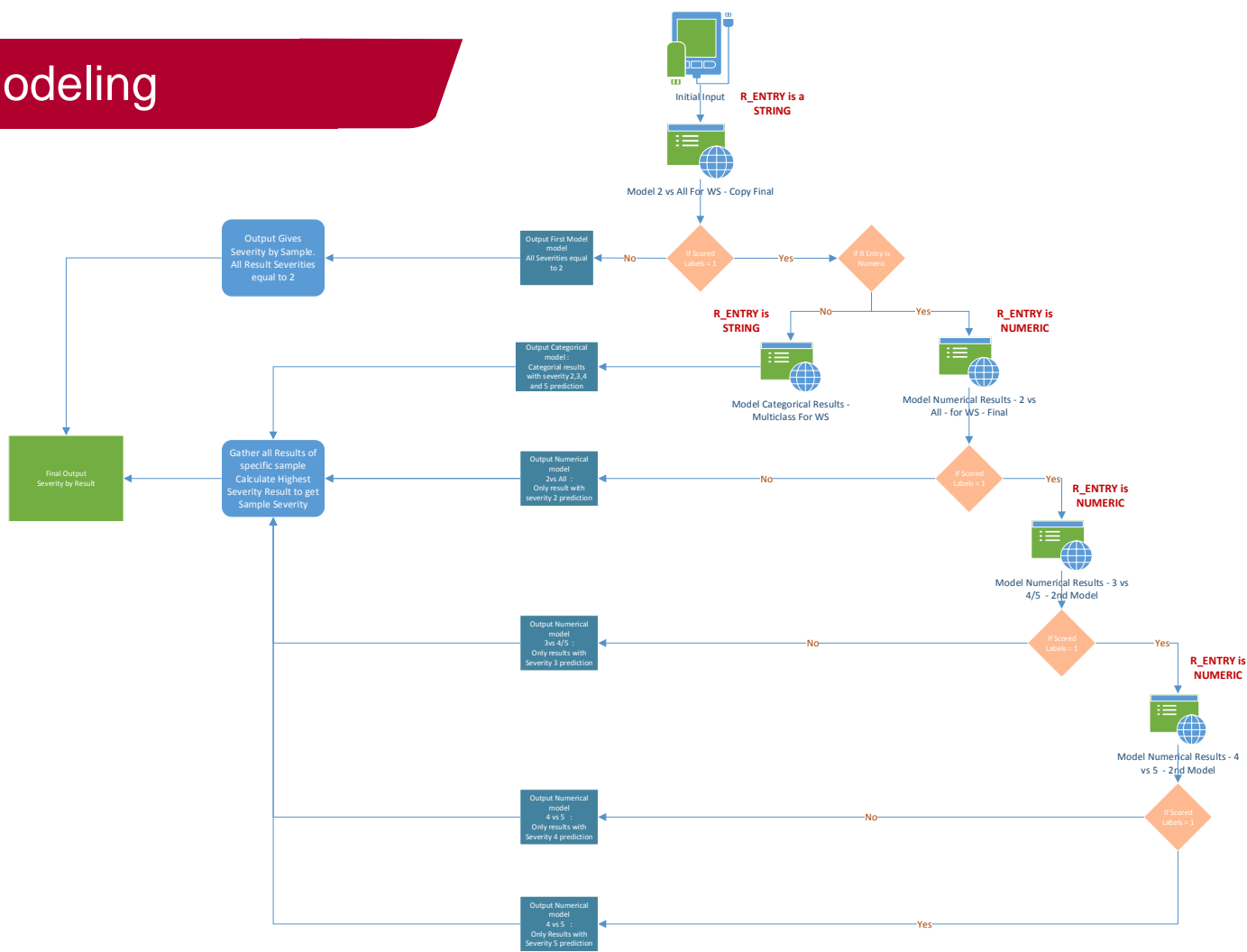
- ▶ Cutting edge cloud solution based on Machine Learning
- ▶ Complete end-to-end cloud solution (IAAS, PAAS and SAAS) on Azure
- ▶ Project team to design and implement solution together with BV



# ML Creation Process

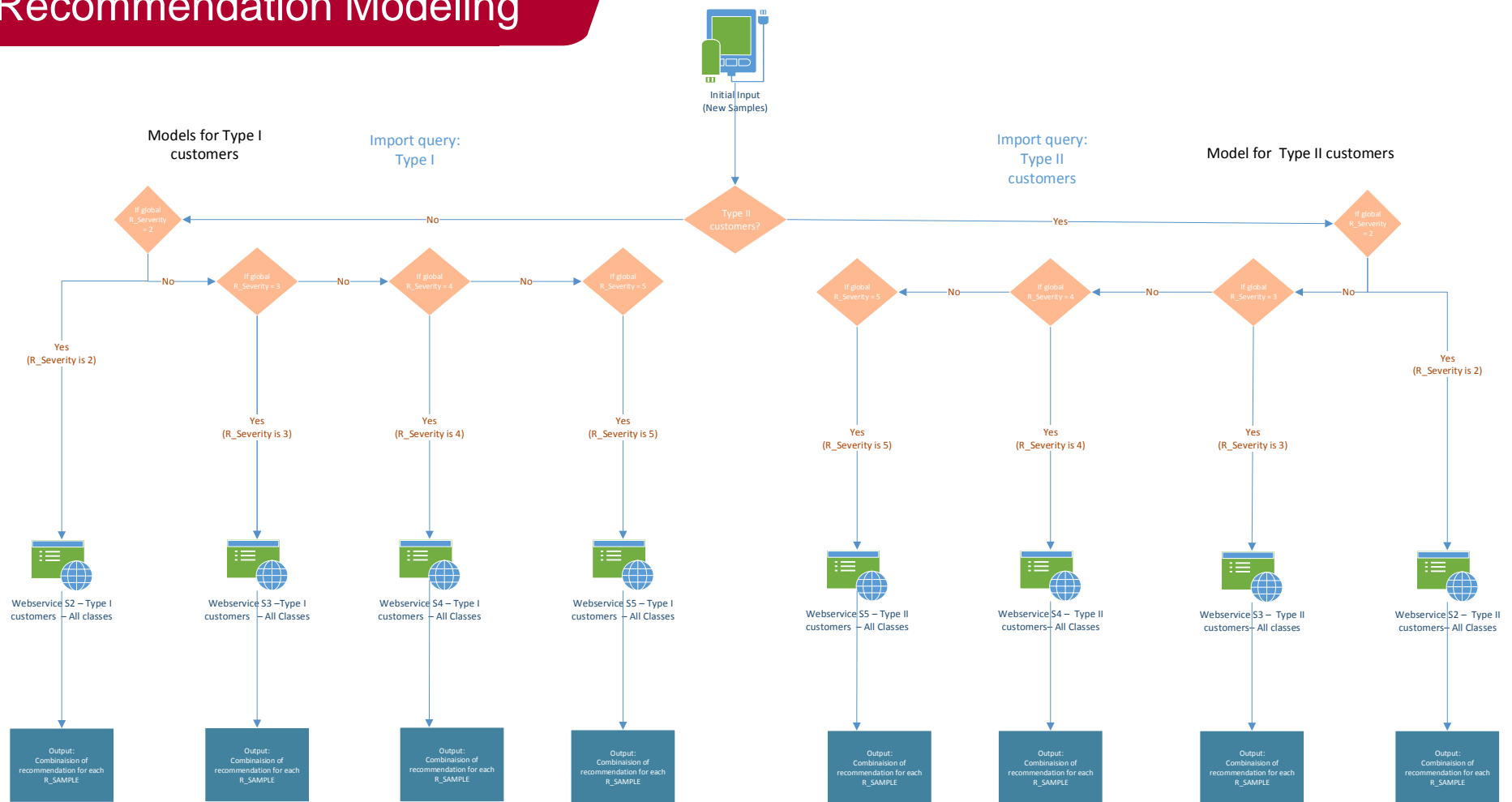


# Severity Modeling

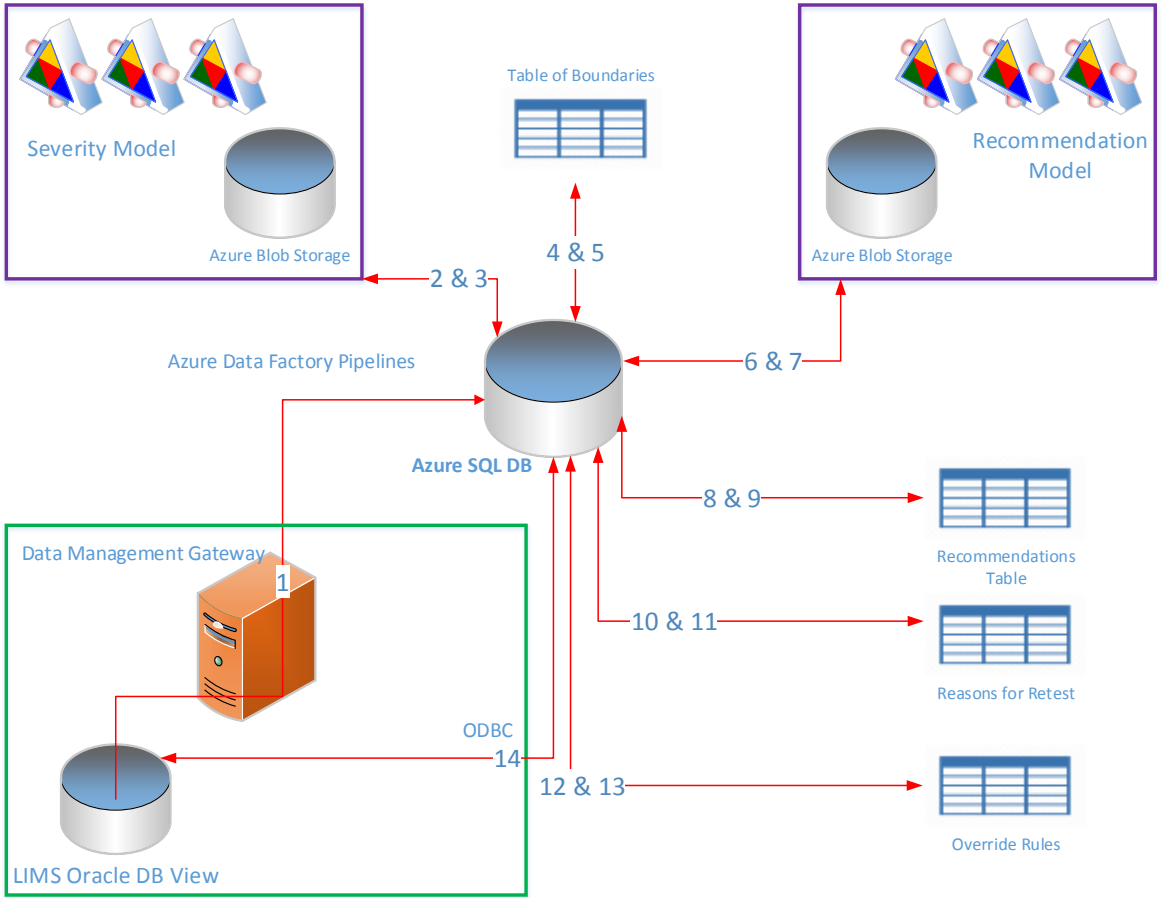




# Recommendation Modeling



# Solution Overview



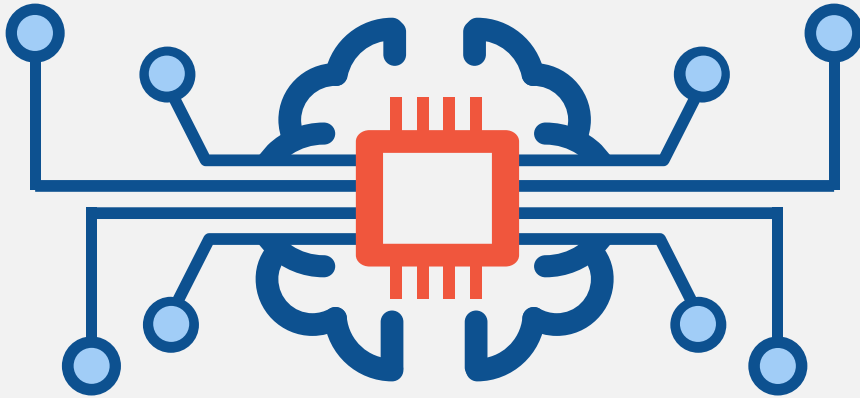
# An Interesting Project

- ▶ Data set size:
  - 450Gb of data over 12 years
- ▶ Data Quality:
  - Data aggregated over 12 years of different quality
  - Data from multiple organizations combined
- ▶ Business process quite complex (from an ML perspective)
  - Criteria for determining result severity, sample severity and wide range of recommendations
- ▶ How did we resolve the problems?
  - Cleaned the data (great thanks to Jonathan Rudnicki)
  - Sampled the data
  - Optimizing data set



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# New Challenges



- ▶ No rules to explain
  - Human error > Process improvements
  - Computer error > Bug fix
  - Machine learning error > Retrain
- ▶ Intelligent, not psychic
  - Need to learn from past experience
  - Current feedback loop is based on “Human Outcome Prediction” i.e. Data Analysts interpretation
  - Ideal feedback loop is based on “Actual Outcome”



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**Q&A**