



USING KNIME FOR OPTIMIZING DIE UTILIZATION

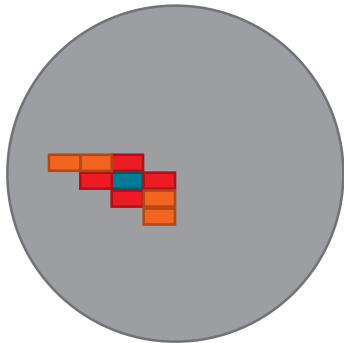
KNIME Fall Summit 2018

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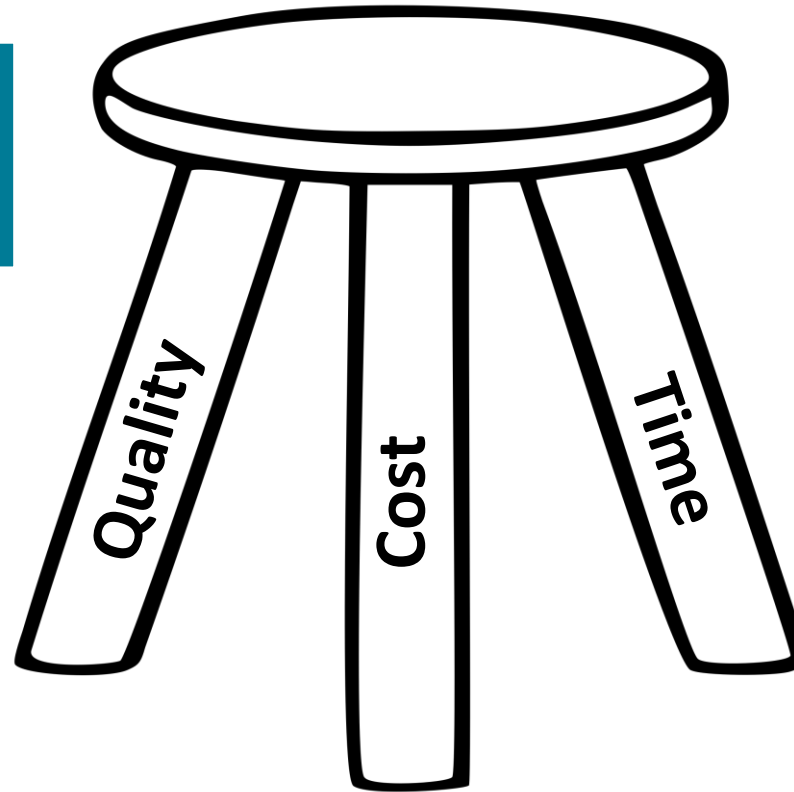


How are we working to overcome the 3 legged stool problem using KNIME and Data Science at AMD?

Optimizing Die Utilization



Intelligent grouping of like die



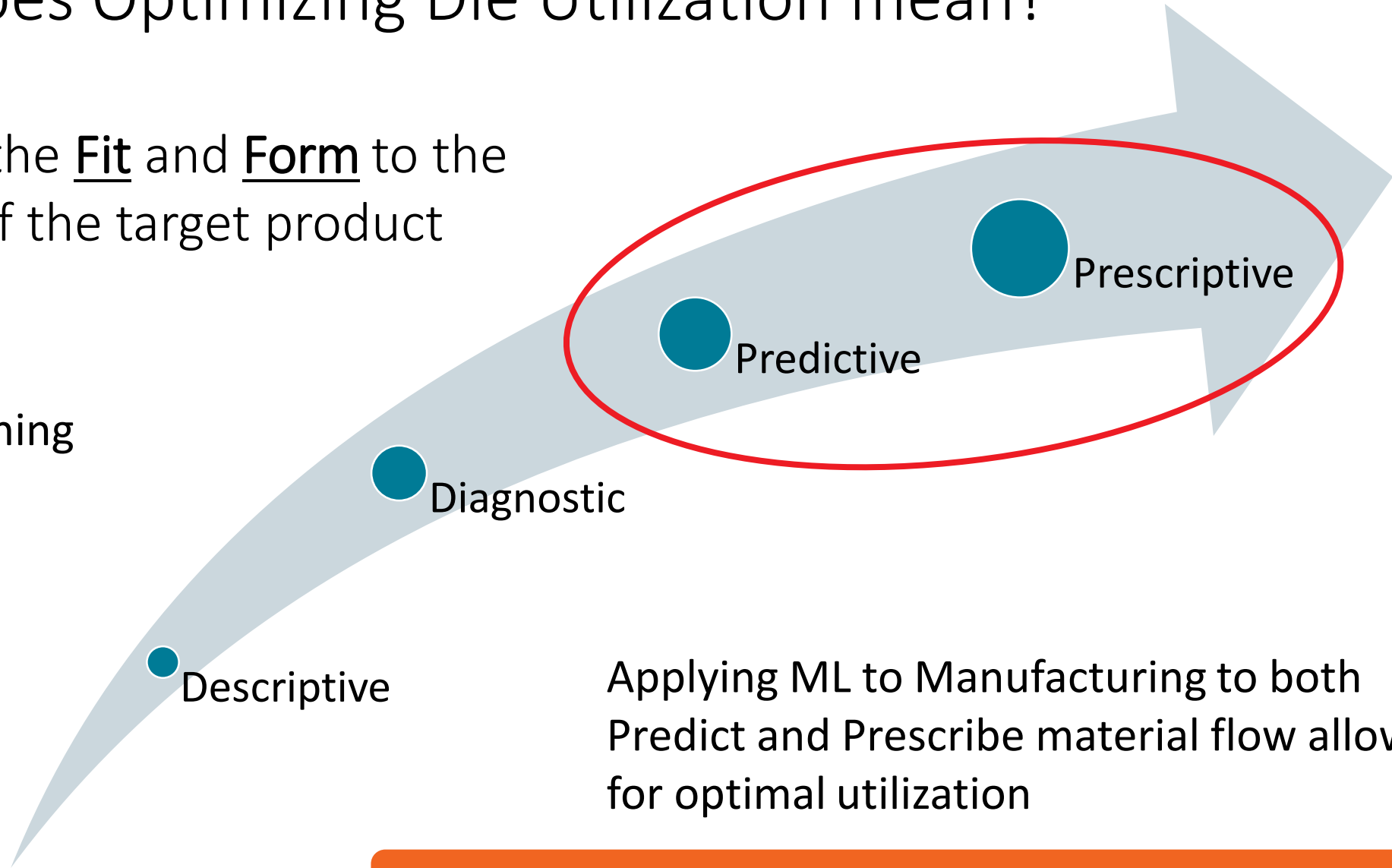
Applied Machine Learning in Manufacturing

Drive a change in culture

What does Optimizing Die Utilization mean?

Matching the Fit and Form to the Function of the target product

- SKU
- Package
- Die Matching



Applying ML to Manufacturing to both Predict and Prescribe material flow allows for optimal utilization

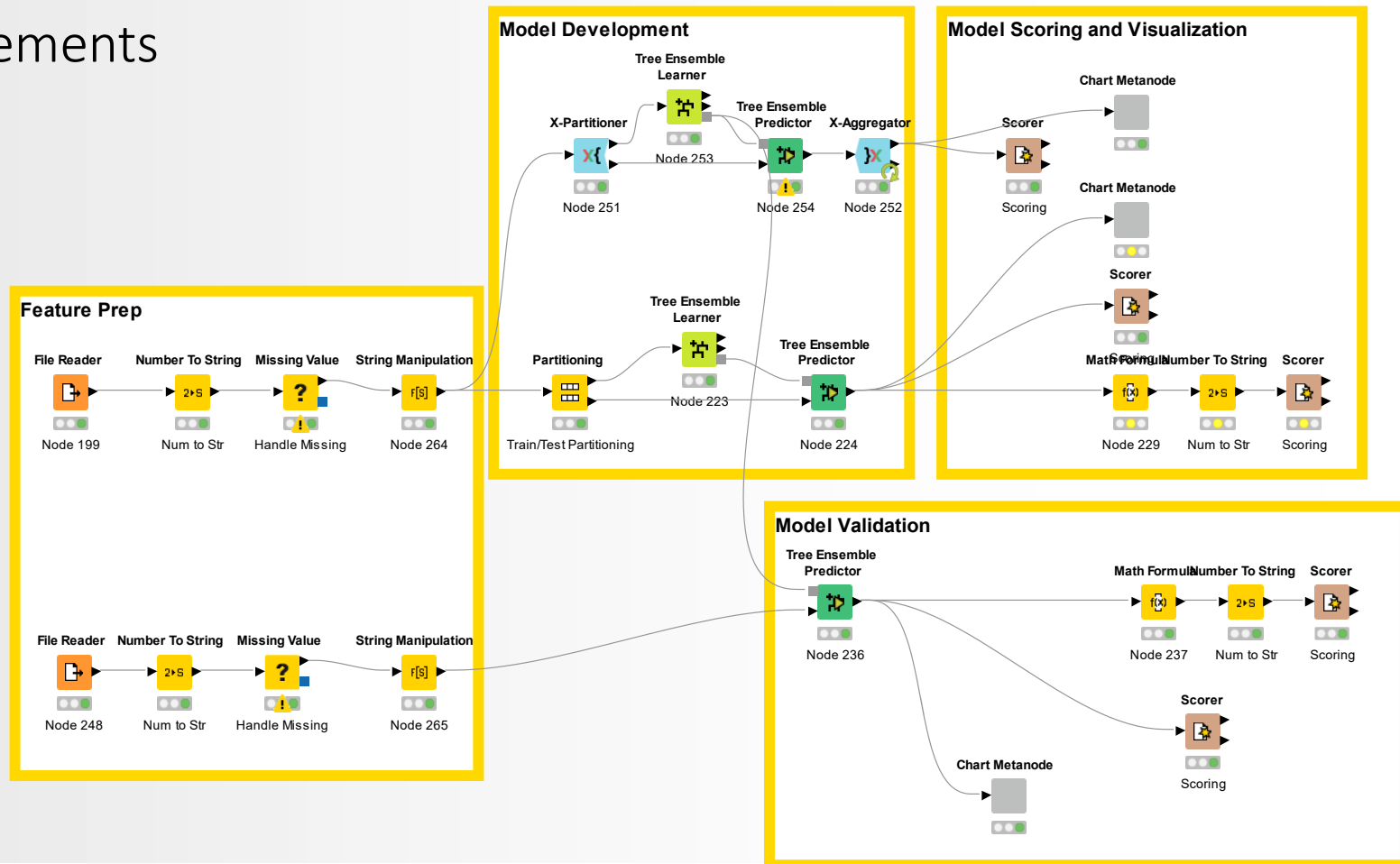
Let's take a look at some prototypes

Tree Ensemble to Predict Backend Test Fails

- Reduced Capacity Requirements
- Improved Yield
- Reduced Variability

1.25%
INCREASE IN YIELD

1.32%
VARIANCE IMPROVEMENT

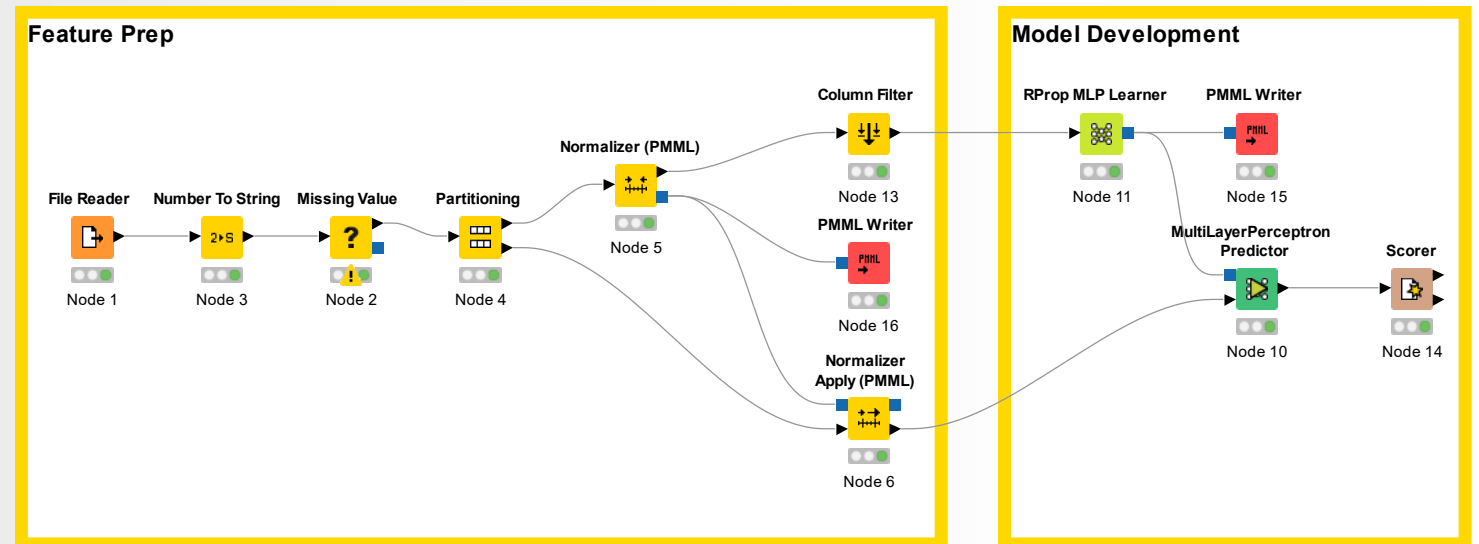


MLP to Predict Backend Test Fails

- POC for no domain knowledge
- Auto-feature selection
- MVP for PMML based virtual insertion

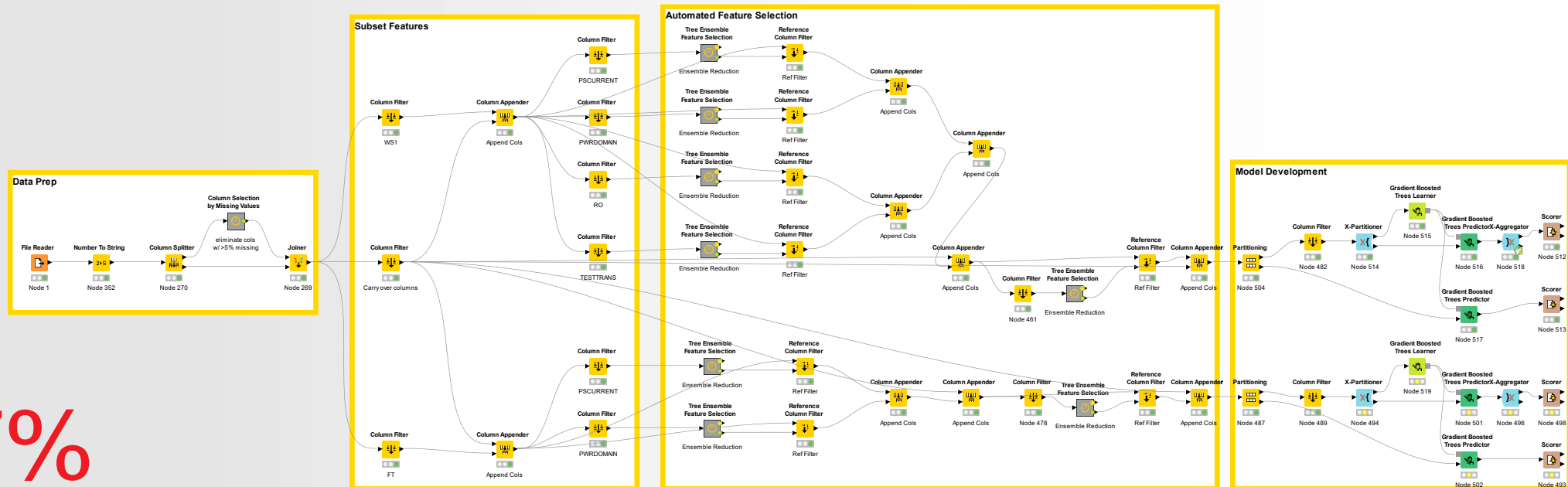
0.67%
INCREASE IN YIELD

1.16%
VARIANCE IMPROVEMENT



Auto-Feature Selection and Gradient Boosted Trees for Debug

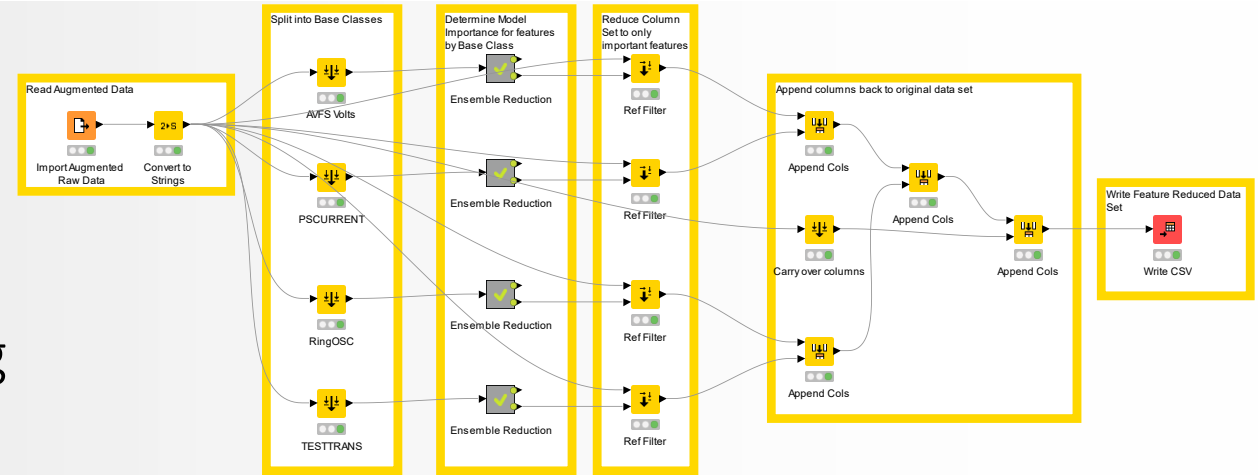
- Automated Feature Selection workflow to identify potential root causes
- Created model to predict units that will fail screen



91.7%
PREDICTION ACCURACY

Gradient Boosted Trees to Predict Required Coverage

- Reused basic workflow from debug project
- Used model to identify material that did not need specific testing based on above average quality

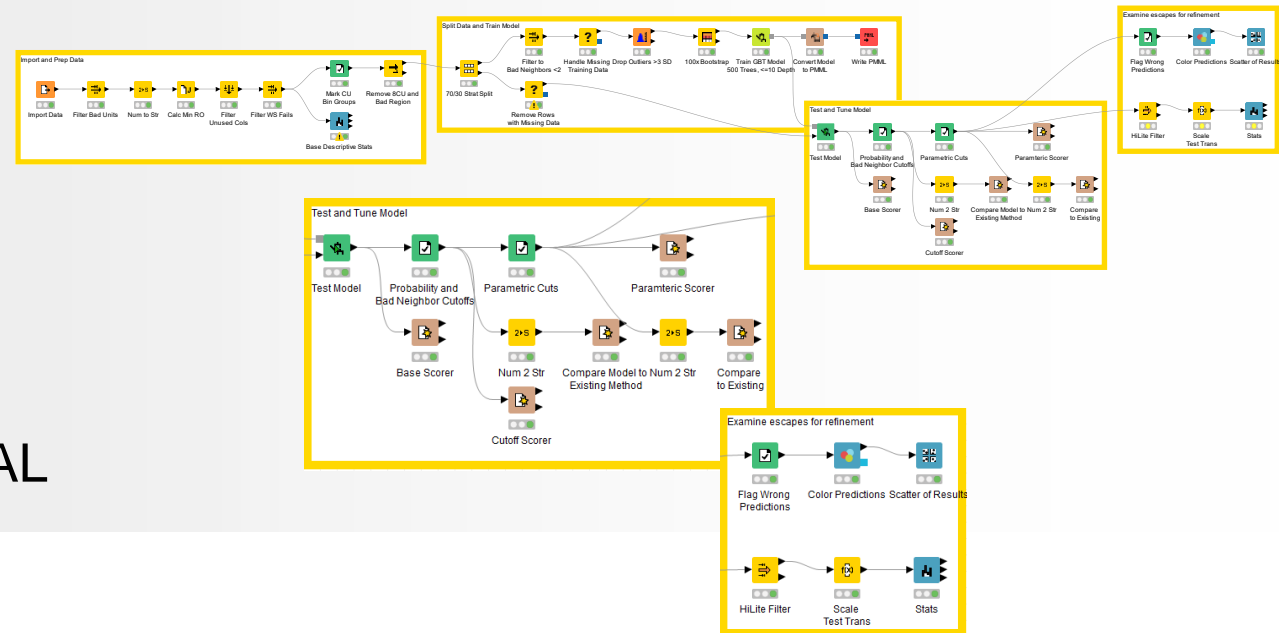


9.22%

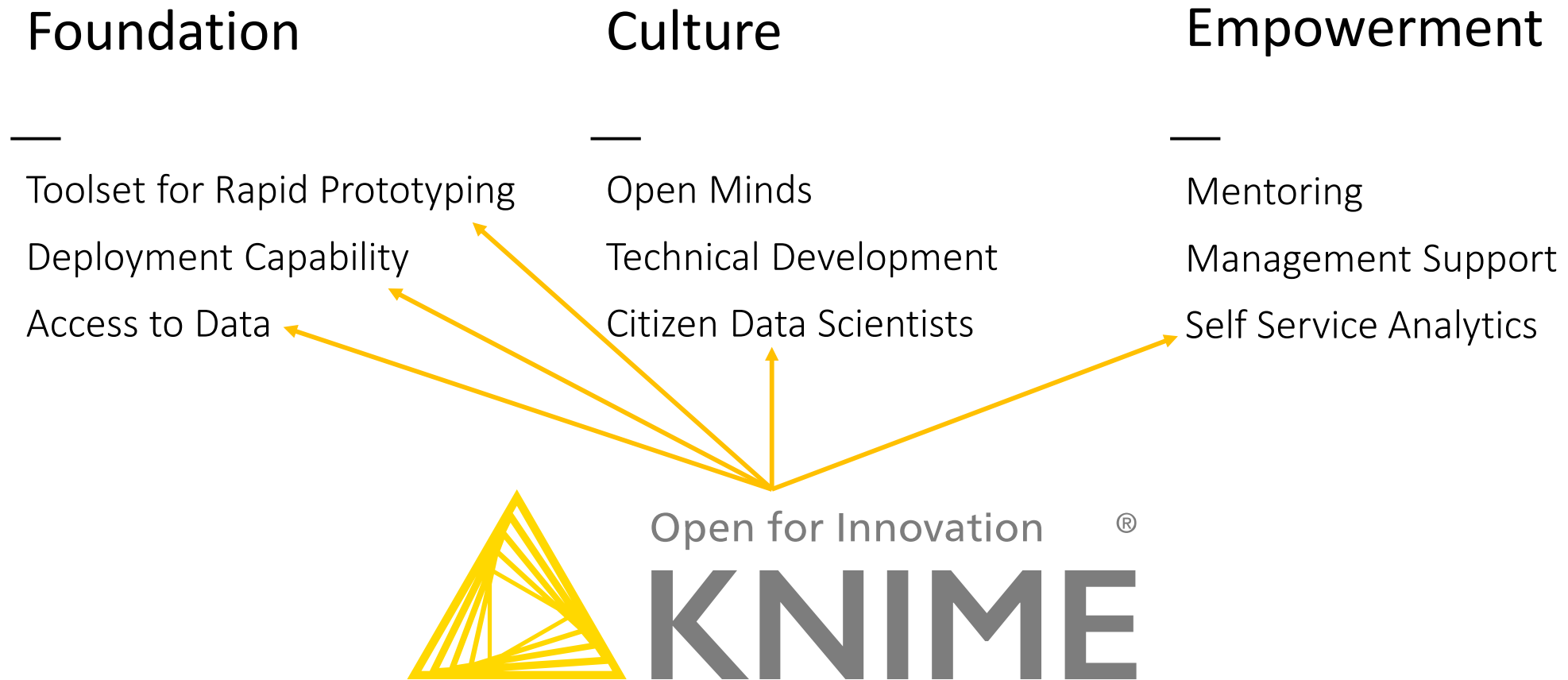
REDUCTION ON TOP SKU

7.77%

REDUCTION ON TOTAL MATERIAL



How are we doing this?



How does KNIME fit in our stack?

RAPID PROTOTYPING

- Quickly put together a workflow to test ideas and develop a study
- Easily expandable to prototype and deployment phase

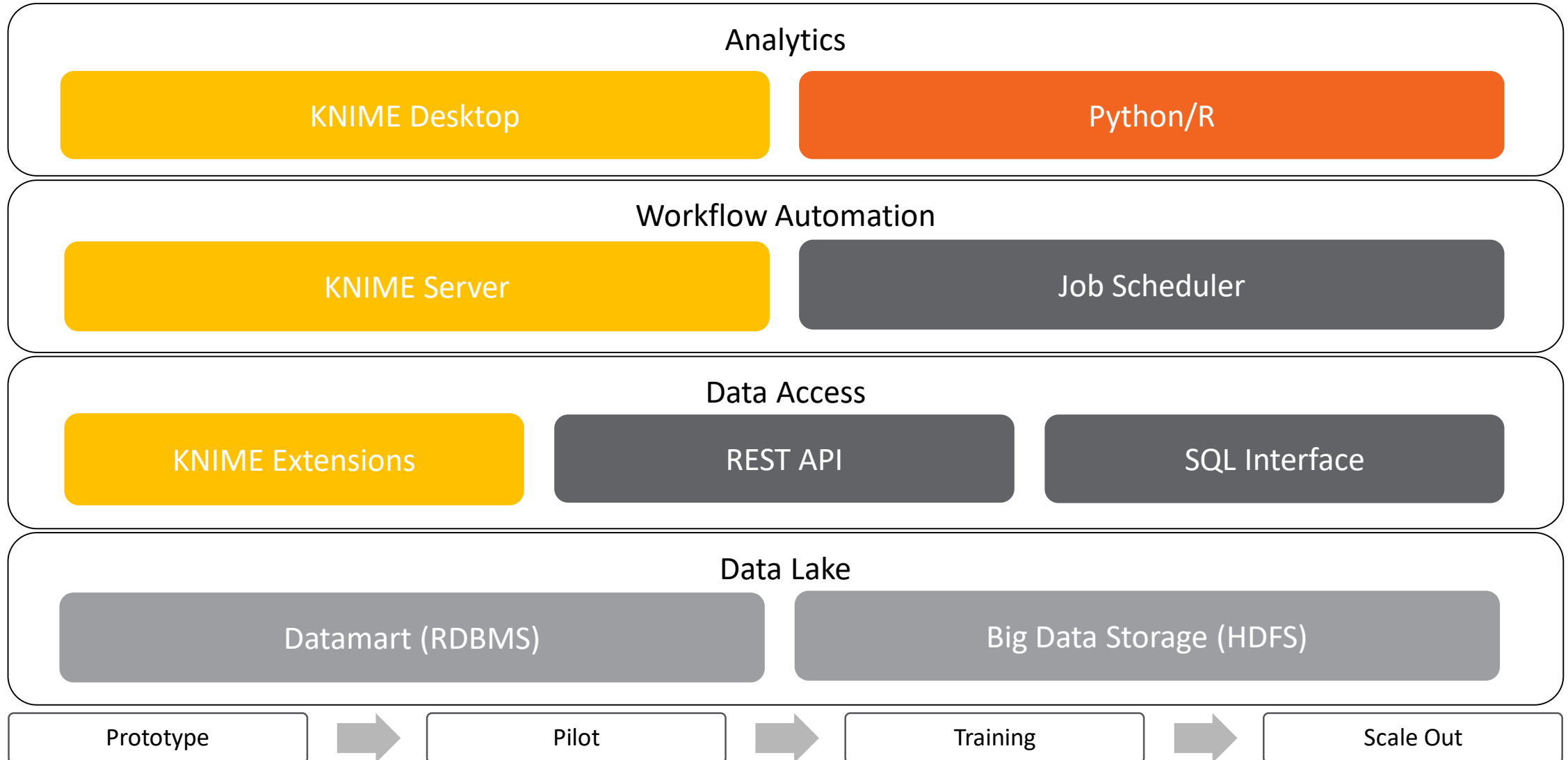
SELF SERVICE ANALYTICS

- User Empowerment
- Drag and Drop Data Science

LOW BARRIER OF ENTRY

- Coders and non-coders alike can use it
- Large amount of free E-Learning material available

Self Service Analytics Framework



Machine Learning Initiative Pipeline

THIS IS HOW WE ARE
DEVELOPING CITIZEN DATA
SCIENTISTS



Open Minds

History of ML, Industry Use
Cases, and Technical Overview
Open to All



Identify Candidates

Select people who are self
motivated and have an interest
in analytics



Use Case Presentation

Candidates get feedback and advice from mentors to guide development



Manager Support

20% Time Commit



Immersion Training

Directed training focused on techniques to develop use case

- KNIME
- Python



Operationalize

Scale out the prototype to a production worthy solution



Mentoring

Provide guidance and support during the development of a functioning prototype



Key Points

Applying Machine Learning to Manufacturing to Optimize Die Utilization

KNIME is Foundational in the Development of our Citizen Data Scientists

Supporting Technical Development of Motivated Power Users

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