

# Revolutionizing Procurement through Smart AI

How oil and gas companies can increase spend compliance, reduce inventory and optimize working capital.



# Data is Procurement's Best Ally.

Monitoring compliance spend ranks extremely high on the priority list of today's Chief Procurement Officer. In order to achieve efficiency in this space, data is a critical enabler. And, for any data to be meaningful, it needs to be usable and readily available.

This has proven to be a monumental challenge in procurement organizations of oil and gas companies, as key sources of data sit with different functions in the organization and across different systems – often without strong central oversight.

One approach to maintain healthy data is to periodically clean it before use. Another approach is to use a repeatable and scalable machine learning model to extract, modify and use relevant attributes from existing data. In our experiences, a ground-up system built using custom algorithms can provide optimum functionality while addressing integration and organizational infrastructure acceptance issues.

## A Client Deep Dive

A major client of ours recently embarked on a journey to use artificial intelligence (AI) and machine learning (ML) to identify opportunities to increase the number of stock items ordered from supplier catalogs for an oil refinery. With this, they wanted to identify orphan items in ERP item master (these are items that do not have a corresponding record in the purchase information record or the supplier catalog).

They also wanted to filter the ERP item master in various obsolescence buckets, such as items not purchased in last 5 years, and items not "active" in eProcurement supplier catalog. We began by reviewing the current state of ordering stock items and identifying reasons for non-catalog buys. While reviewing the ordering process we identified several business opportunities.

### Opportunity 1: De-duplicate item master

The diagram below depicts the process flow for ordering stock items. The item master is built up as orders are placed or as items are created by central procurement. Although the client used a taxonomy, it was not enforced, resulting in several duplicate items. There was an opportunity to de-duplicate items to reduce inventory.

### Opportunity 2: Optimize inventory

The item master was linked to local inventory at one warehouse. Hence availability of items in inventory was checked only at one warehouse. There was an opportunity to optimize inventory by linking the item master to inventory in multiple warehouses across a region.

### Opportunity 3: Increase catalog buys

Demand generated by the MRP cycle based on planning parameters resulted in the purchase information record (PIR) for the item. The order was placed if a match was found for the item in the supplier catalog. Only 5% of items found a match based on the item number and the supplier part number. There was an opportunity to increase this match rate using automatic matching through smart use of machine learning, thereby increasing catalog buys.

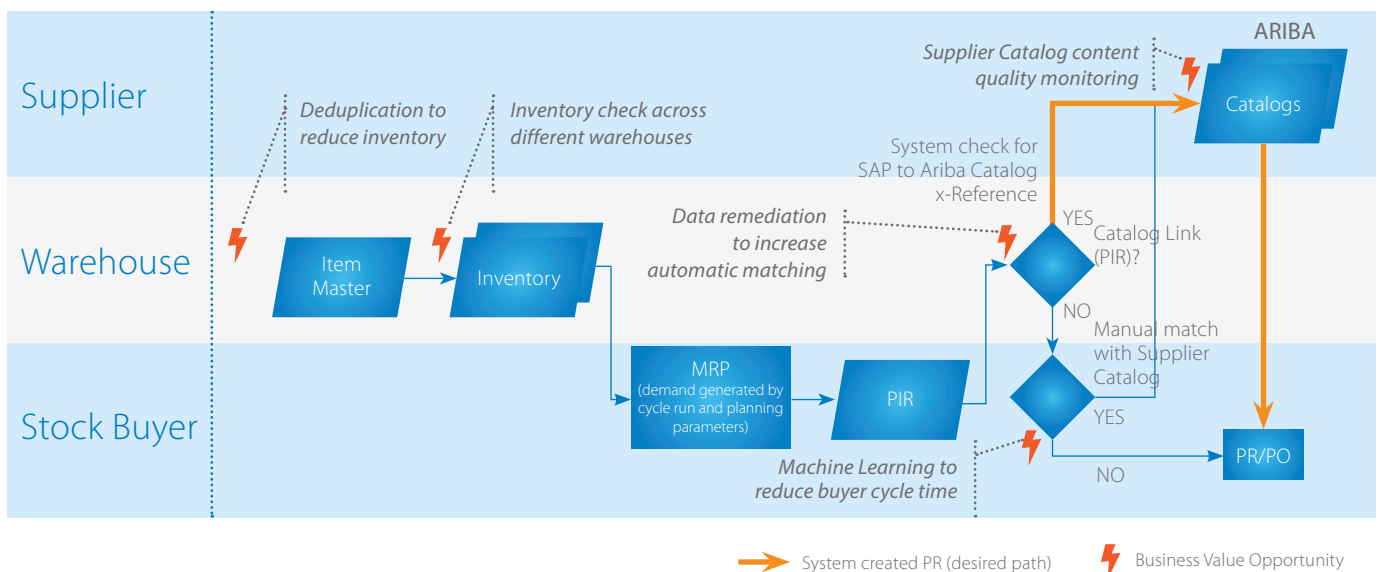
### Opportunity 4: Reduce buyer cycle time

Items that did not find a match were processed manually by the buyers. If buyers found a match for the item in the supplier catalog, they ordered the item through the catalog, otherwise they placed a non-catalog order. There was an opportunity to provide buyers with a system-based approach to quickly match items that would also serve as the 'human input' for the ML algorithm.

### Opportunity 5: Improve supplier catalog data quality

The results of the AI and ML could be used to improve data quality in the supplier catalog by further standardizing the requirements and formats for attributes, such as supplier part number, manufacturer part number and item description.

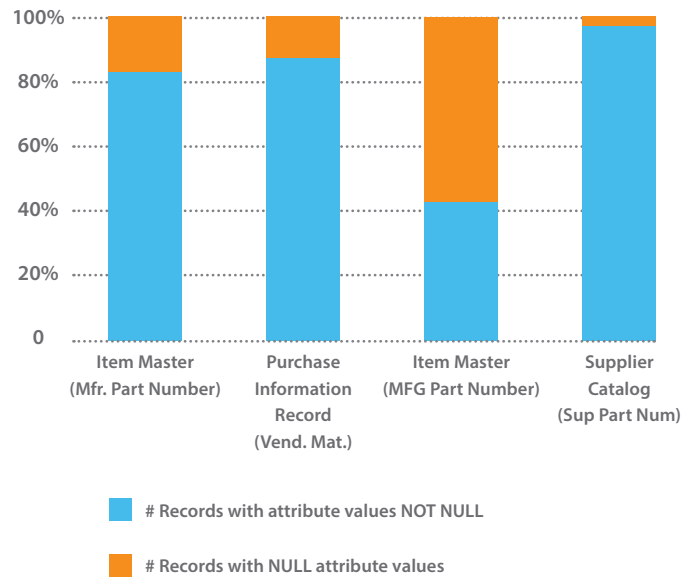
## Ordering Stock items from the ERP



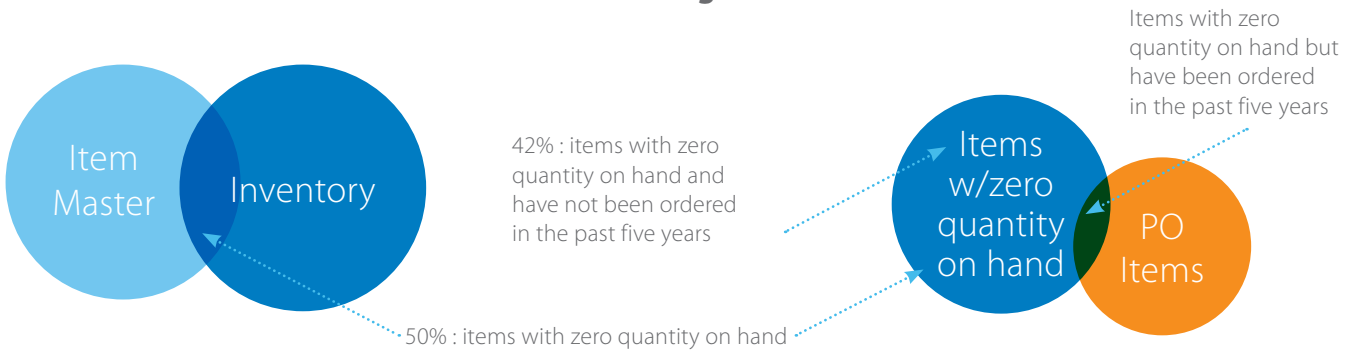
We also assessed the health of the data. We found similar attributes were named differently and key attributes had missing values, redundant spaces and special characters. The adjoining figure shows the key attributes with missing values. Less missing values were desired since these attributes were used for matching records.

The next task was to identify items with zero quantity on hand by matching records from the item master with the inventory. By matching this subset of records with purchase orders, items were identified with zero quantity on hand and no orders in the past five years. These items were 'obsolescent' items, creating 'noise' in the item master.

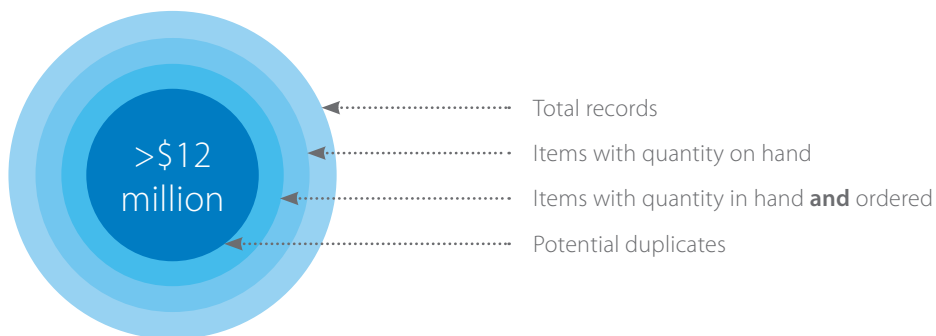
### Missing Values in Attributes



### 42% of Items Can Be Purged from Item Master



### Opportunity to reduce inventory by more than \$12 million by identifying duplicate records in item master



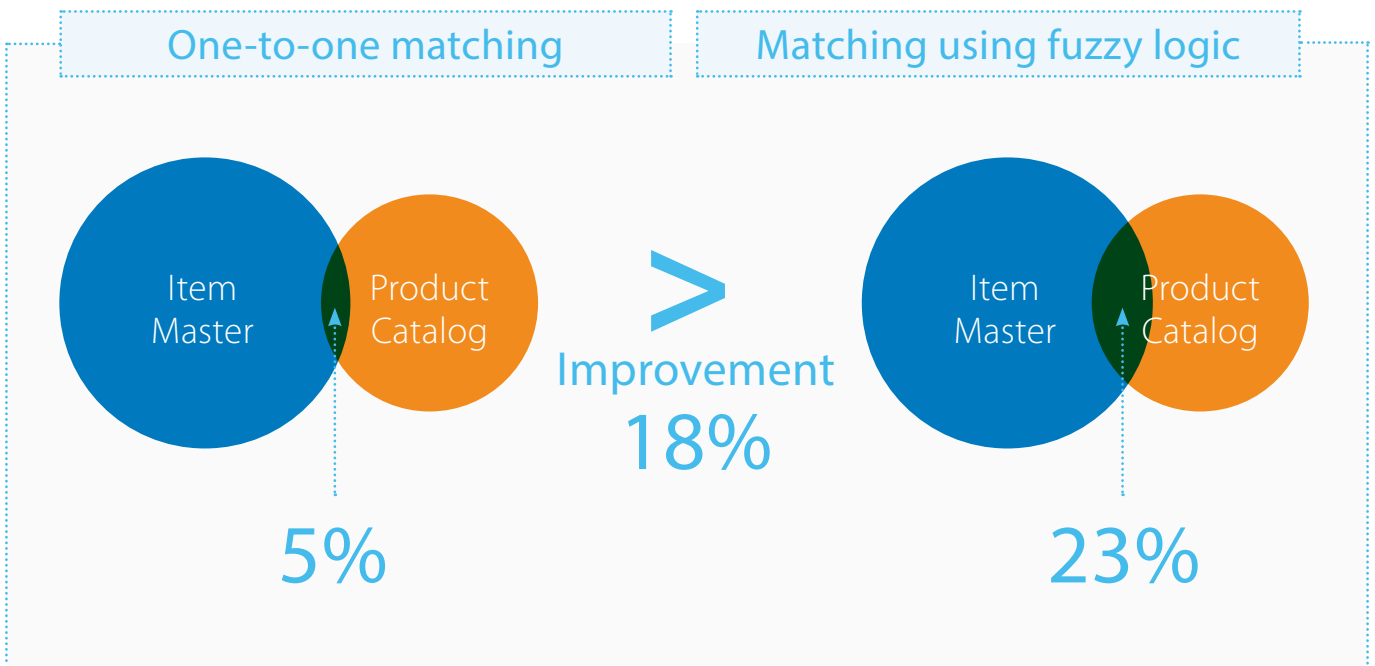
Potential duplicates were identified using natural language processing (NLP) and used cosine matching to match the manufacturing part number from various items. Wherever the number was either missing or not usable, the description was used to identify potential duplicates. The next step was to manually review duplicates and update the algorithm based on the feedback (to improve the algorithm).

Items in the item master could be matched with those in the supplier catalog. An increase in the match rate resulted in greater compliance spend as more items would be ordered from the supplier catalog. The items were matched in two stages: a one-to-one simple match and the second one using fuzzy logic and text match. The match rate increased by 18%.

## Powering the procurement agenda forward

From our examples above, it's clear AI and machine learning are powerful capabilities that can be used to substantially increase the match rates between item master and supplier catalog content. This creates opportunities to remediate data, increase spend compliance, reduce duplicates, and optimize inventory. To enable today's procurement agenda, our recommendation is to create a system built using custom algorithms, to provide optimum functionality to deliver immediate impact for the enterprise.

### Opportunity to increase compliance to spend by improving match rates between item master and supplier catalog



## About the Experts

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### **Sachin Padhye** – Sr. Principal, Energy & Utilities practice (U.S.)

Sachin works with large oil and gas companies in the upstream, midstream and downstream areas to frame their digital strategy across customer and employee experiences. He helps his clients quantify value beginning with industry opportunities and ending with decisions built with big data, analytical tools and visualizations and narratives. His current focus is digital data monetization, where he helps companies put a monetary value to the data that is used to execute their digital strategy. Sachin has an MBA from the University of Michigan.



### **James Soos** – Partner, Energy & Utilities practice (U.S.)

Jim is a partner in our thriving energy and utilities practice. He brings over 25 years of consulting experience and possesses a highly-successful suite of work with clients spanning the upstream value chain. Jim joined Infosys Consulting as part of the Noah Consulting acquisition in 2015. Since then, he has been instrumental in the growth of Noah and has continued to lead one of the practice's largest accounts. Overall, his strength and expertise are anchored around program management for large-scale data management projects, master data management strategy, application portfolio strategies, and ERP solutions for clients across the oil and gas space.

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