IBM Maximo Inventory Optimization (MIO)

AI-driven MRO Inventory:
Less downtime, more savings

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Today’s Objectives

- State of the Industry
- MRO Challenge
- Overview
- How it Works
- AI in MIO
- Customer Successes

Trailing organizations view MRO as a traditional **cost center**, while leading organizations utilize MRO as a strategic catalyst for growth

$91B spent on MRO spares in 2024

8-10% of MRO spare parts inventory used annually

20-30% of inventory value is spent on holding costs

20-30% of inventory is obsolete at any given time

A lot of working capital is tied up in stockrooms, **going obsolete!**

Fund new projects

Pay for upgrades (MAS)

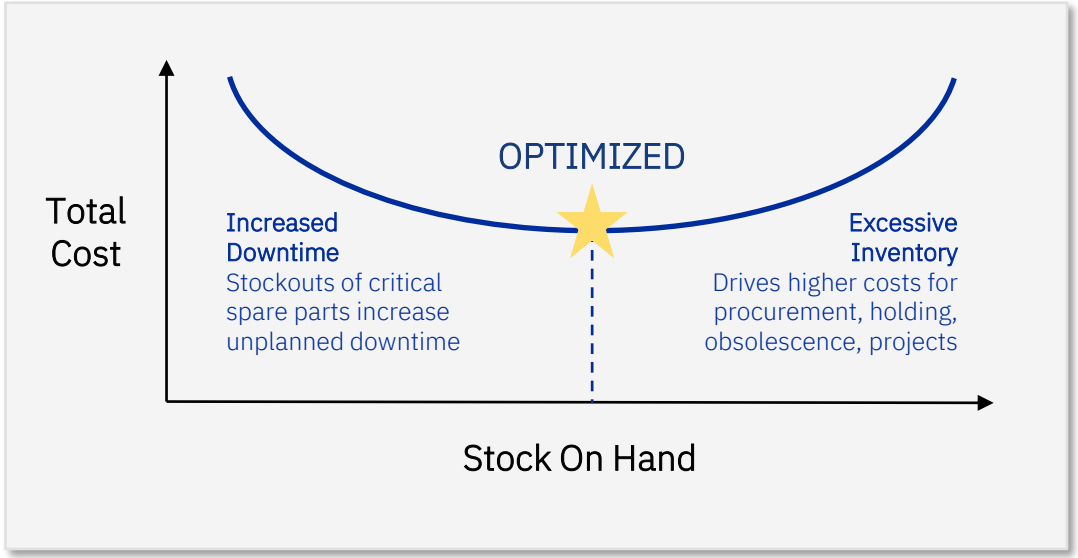
Improve balance sheet

Reduce operational costs

Increase shareholder value

Maintenance, Repair, & Operations (MRO) Inventory Challenge

Why Optimize MRO Inventory?



Both Under and Over Stocking Drive Significant Costs

Why is Optimization so Challenging?

Massive number of unique MRO parts	Tens to hundreds of thousands of unique parts need to be optimized
Many input variables	Lead time, criticality, where used, number of suppliers, cost, adding new parts, etc.
Inevitable demand and supply changes	Process changes, production changes, acquisitions, decommissions, ERP/EAM changes, lead times, suppliers, etc.
Apply accurate cost model	Accurately factor in critical costs including procurement, downtime, holding, etc.
Cross functional stakeholders	Requires collaboration across functional areas including supply chain, materials management, maintenance, reliability, operations

Complexity

MRO Inventory Values are often >$100M and increasing YTY

IBM Asset Lifecycle Management – An Integrated Solution

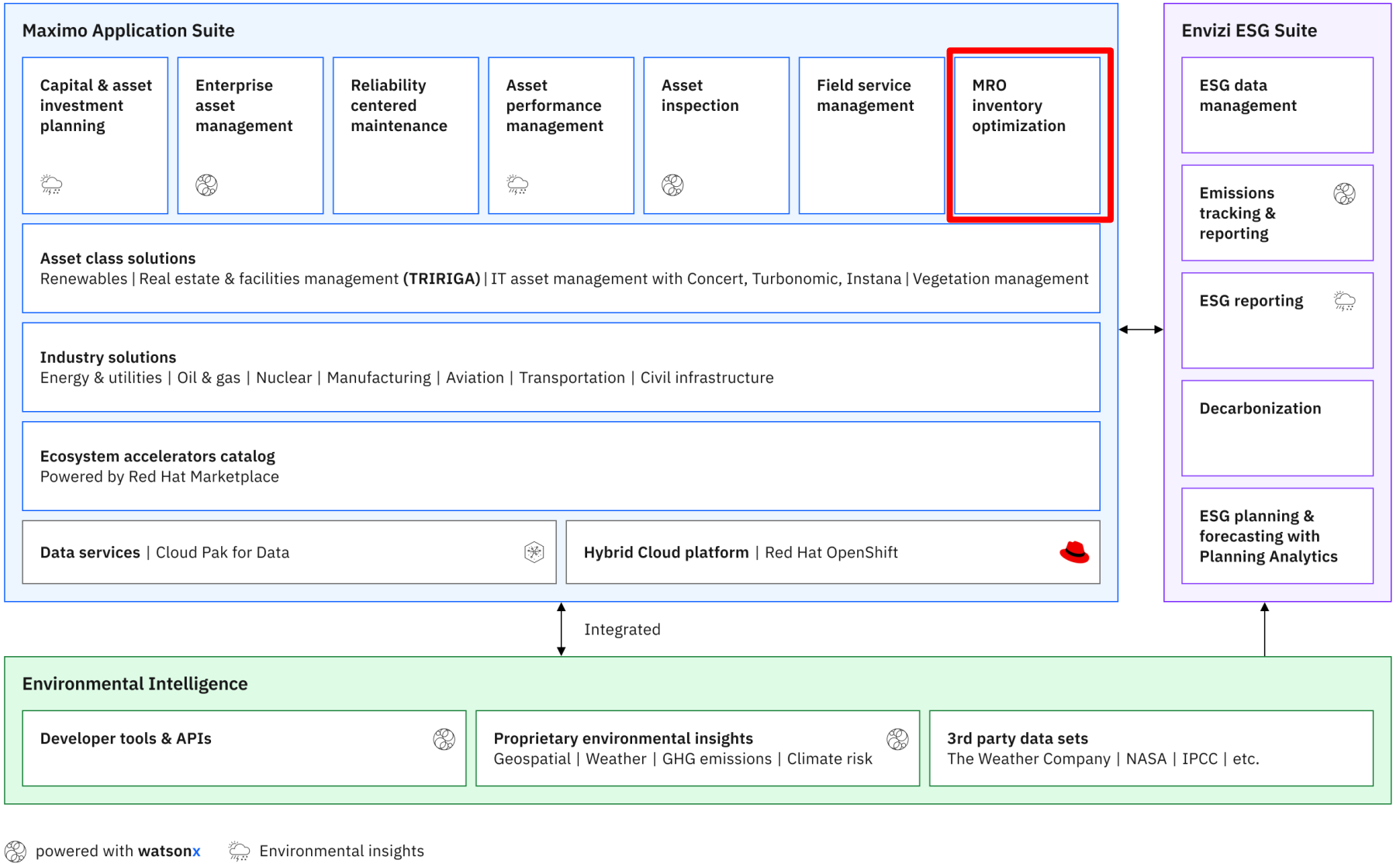
Powered by Maximo Application Suite SaaS

Extend the lifespan of assets.

Reduce maintenance and operations costs.

Manage risk associate with availability and sustainability

Increase workforce productivity.



IBM Maximo Inventory Optimization (MIO)

IBM Software as a Service (SaaS):

- Continuously optimizes MRO spare parts inventory
- Recommendations based on prescriptive analytics and optimization algorithms
- Rule-based criticality
- Consolidated data visibility enables new insights and actions
- Equipment visibility
- Process and workflow automation
- Highly configurable

Customer Data

- Integrates with ERP/EAM
- Certified connectors (Maximo, SAP)

↓40%
Inventory Cost reduction

↓40%
Inventory Analysis time reduction

↓50%
Asset Downtime (unplanned reduction

↑25%
Service Level improvement

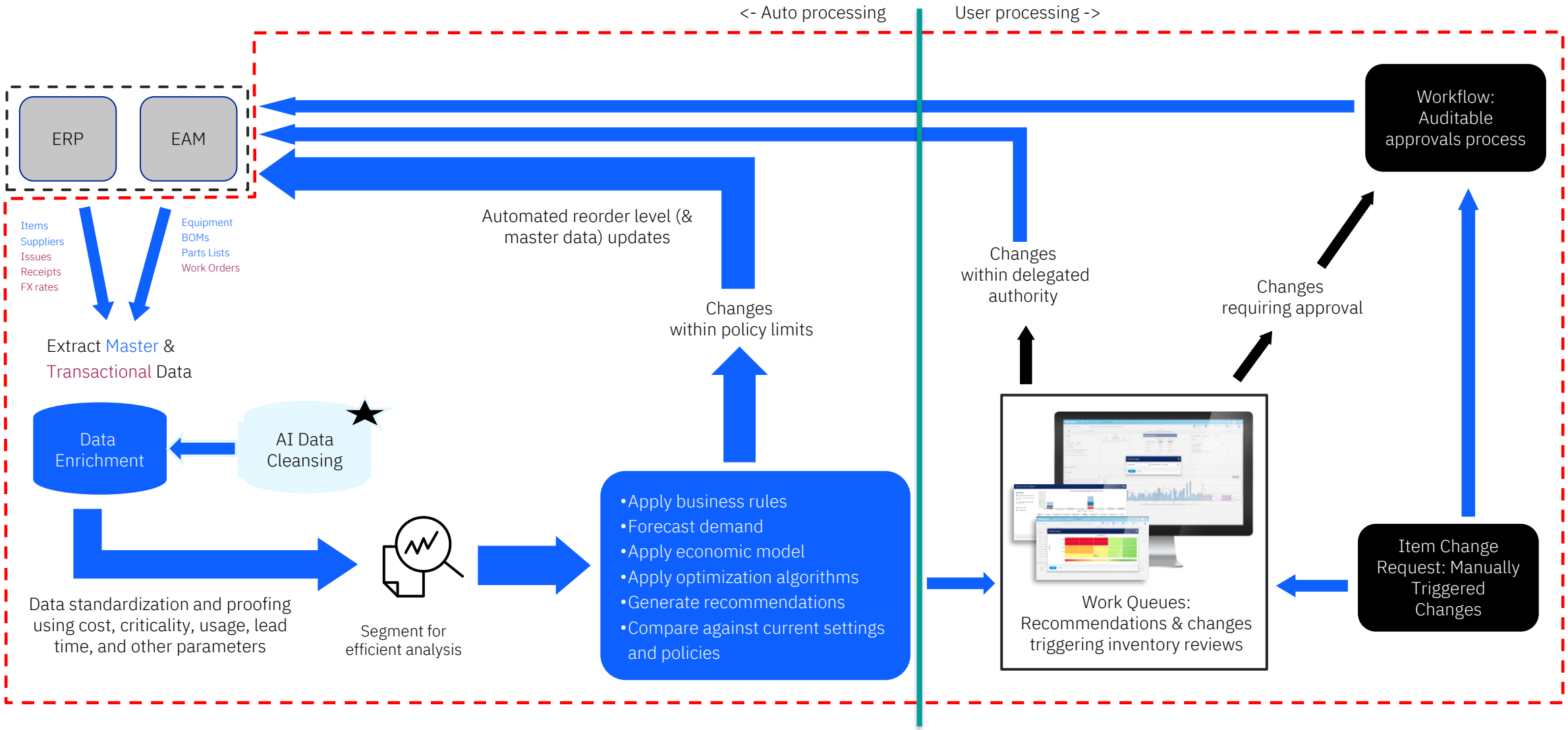
↑35%
Maintenance Budget savings

3-6 months
Implementation (typical)

ROI in less than 12 months

How IBM Maximo Inventory IO works:

Continuous, Automated Optimization



Monthly **reorder level** updates, daily transaction and stock on hand updates/alerts (if enabled)

Automated process to assess spare parts criticality

Maintenance & Operations

PUMP-101A

Equipment Master

- Criticality: A
- Class: Pump
- Process: Utilities

Starting point for material criticality

Are certain classes more critical than others?

Production risk?
EHS risk?
Financial risk?

BOM
1234-MOTOR
6303-PUMP
6304-BEARINGS
9404-SEAL

Materials Management & Procurement

Work Order
PUMP-101A
Priority 1, RIME 12
Planned & scheduled
EHS (env, health, safety)
Parts:
1234-MOTOR
4555-COUPLING GRID

1234-MOTOR

Material Master

- Class: Motor
- Criticality Flag: Y
- Supplier: ACME

Safety?
Repairable?
Consumable?
Bulk?
Office supplies?

Trusted?

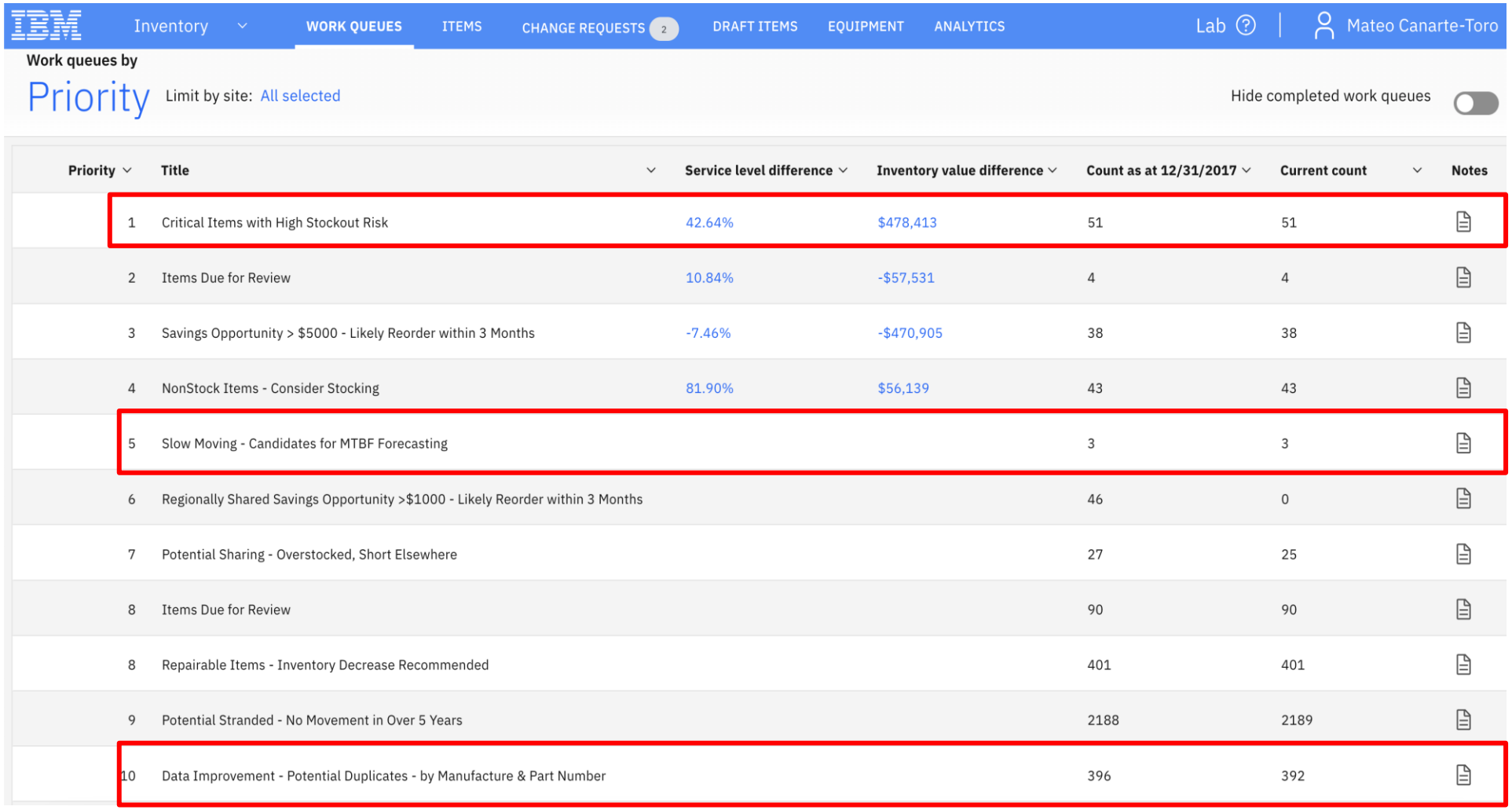
Contract?
Single source?
Long lead-time?
High price?
Shelf life?

Automatically populated & prioritized work lists using Work Queues

Work queues align to inventory management strategy

Inventory strategy aligns to maintenance strategy

- Rule based
- Update dynamically as data is refreshed
- Aligned to inventory and asset management strategy
- Use case example: movement on slow/non-moving material
- Can use any data field in MRO IO to build a work queue

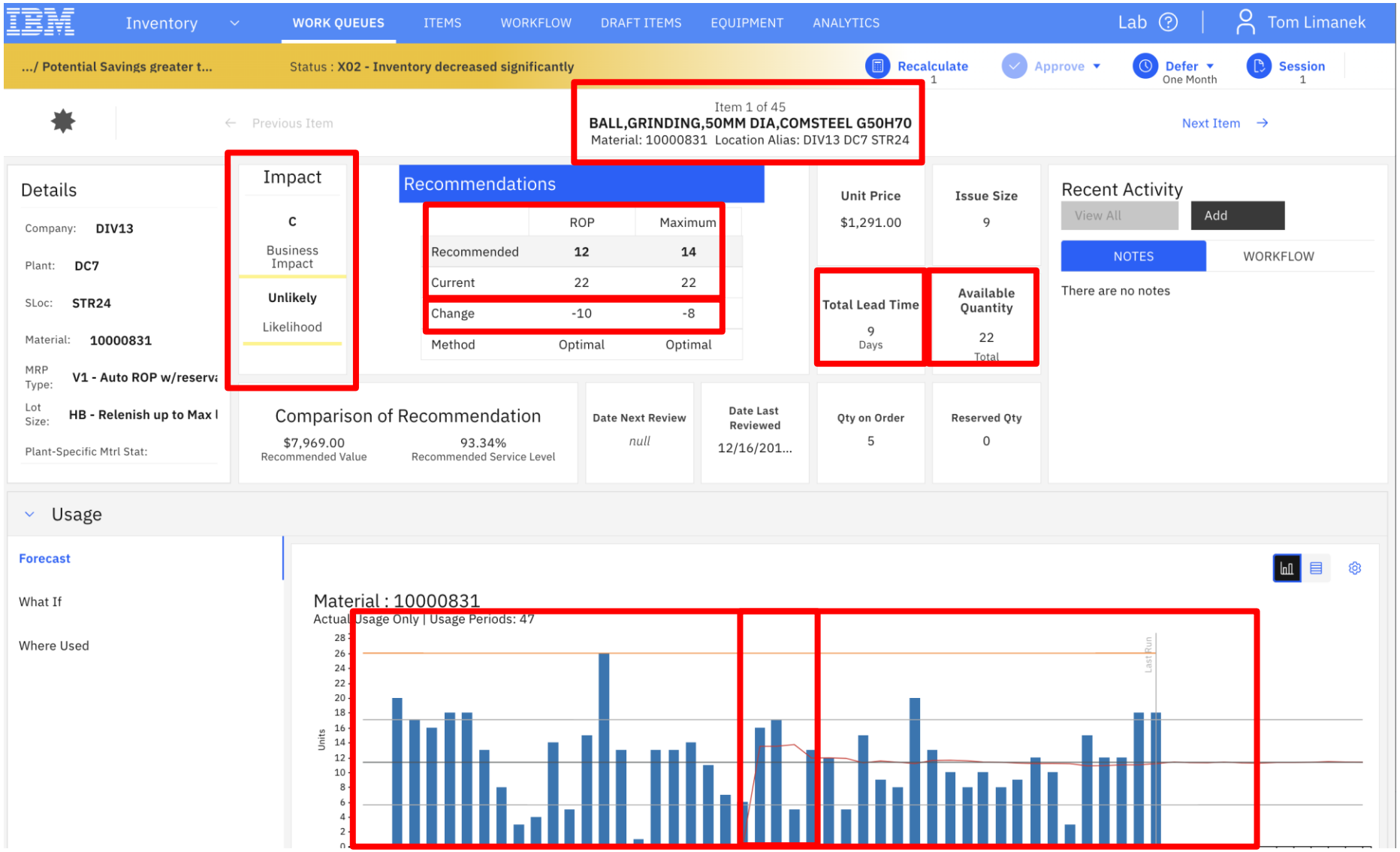


Priority	Title	Service level difference	Inventory value difference	Count as at 12/31/2017	Current count	Notes
1	Critical Items with High Stockout Risk	42.64%	$478,413	51	51	
2	Items Due for Review	10.84%	-$57,531	4	4	
3	Savings Opportunity > $5000 - Likely Reorder within 3 Months	-7.46%	-$470,905	38	38	
4	NonStock Items - Consider Stocking	81.90%	$56,139	43	43	
5	Slow Moving - Candidates for MTBF Forecasting			3	3	
6	Regionally Shared Savings Opportunity >$1000 - Likely Reorder within 3 Months			46	0	
7	Potential Sharing - Overstocked, Short Elsewhere			27	25	
8	Items Due for Review			90	90	
8	Repairable Items - Inventory Decrease Recommended			401	401	
9	Potential Stranded - No Movement in Over 5 Years			2188	2189	
10	Data Improvement - Potential Duplicates - by Manufacture & Part Number			396	392	

Viewing material details in depth with Item view

User experience focus allowing separate customizable screen layouts for:

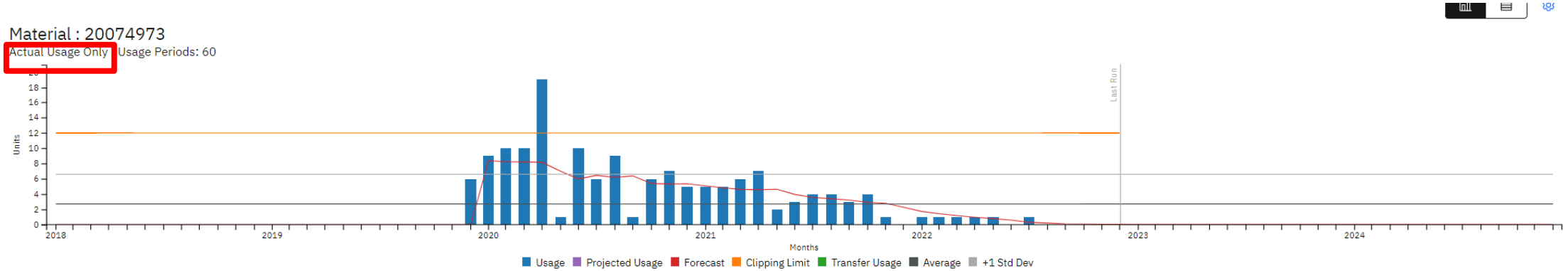
- Corporate view
- Work queue views (per work queue)
- Personal views

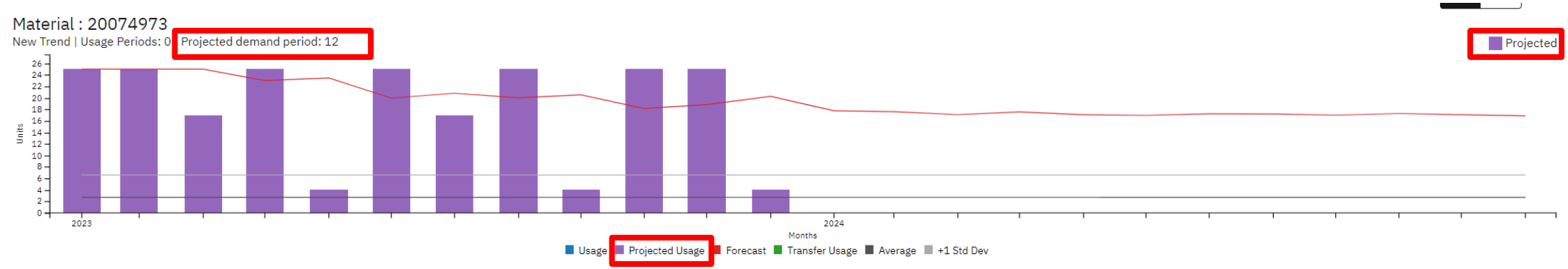


Setting reorder levels for planned issues only

Like only using unplanned issues, customers can choose to set reorder levels based on forecasted future usage only.

- Generally, MRO IO will set reorder levels based on all historical consumption
- MRO IO has the capability to import **maintenance** or **project** plans to set reorder levels
- Planned usage can be applied in bulk or individually.

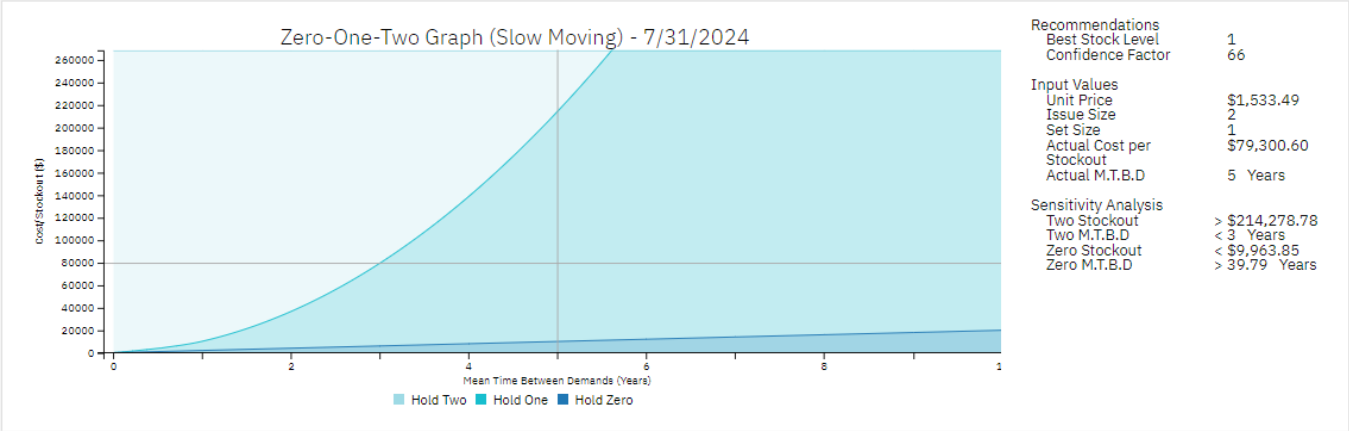


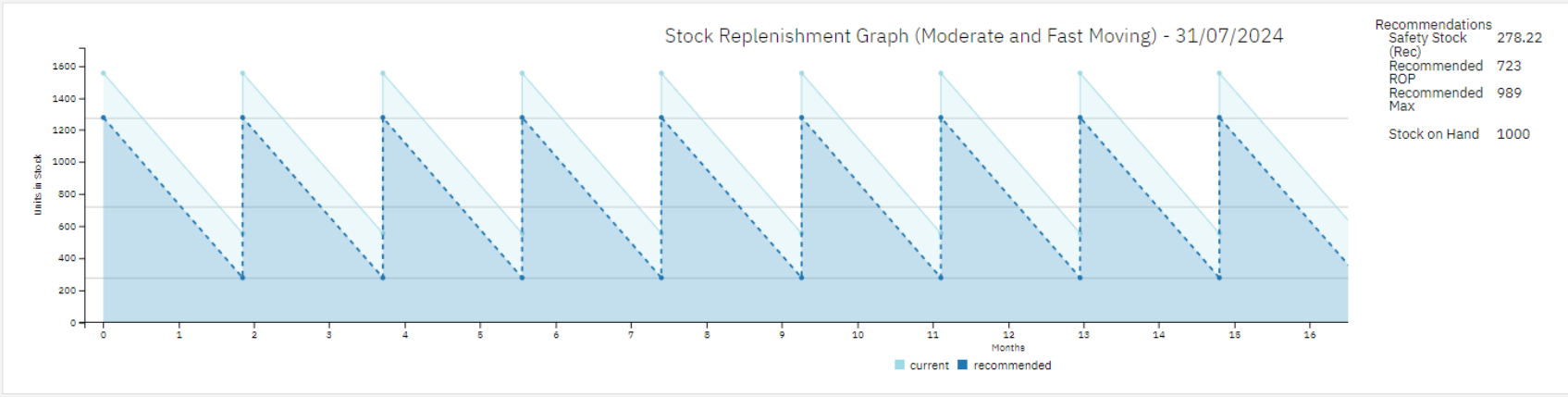


Modeling future changes using ‘What If’ scenarios

What if analysis allows for impacts to be assessed before changes are committed

- 0-1-2 method for slow moving items
- Saw tooth for moderate and fast-moving items

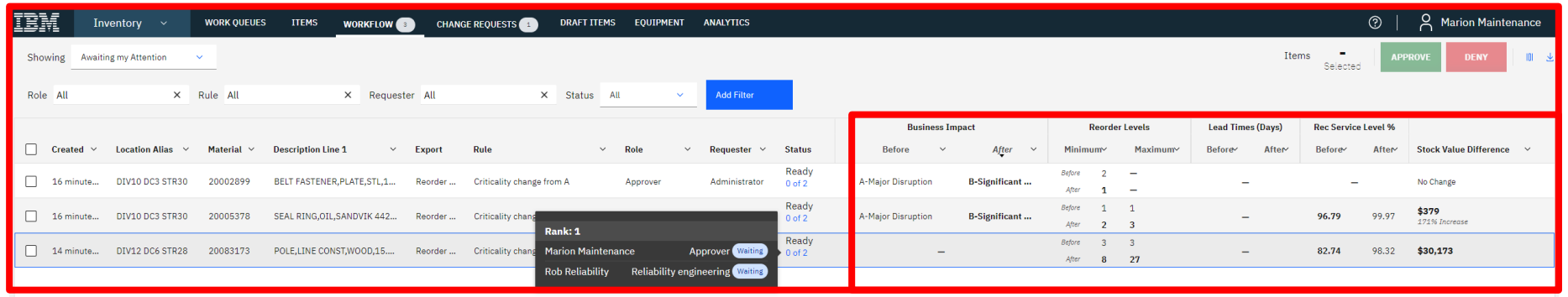


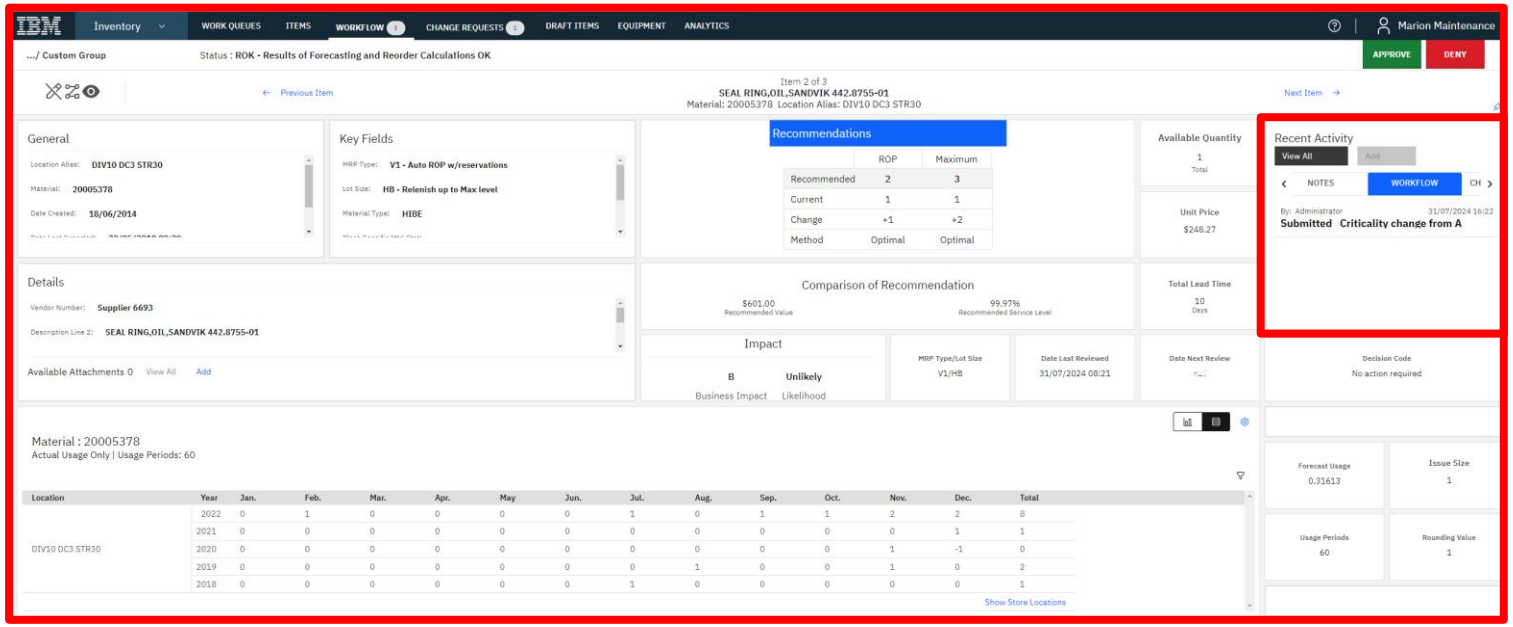


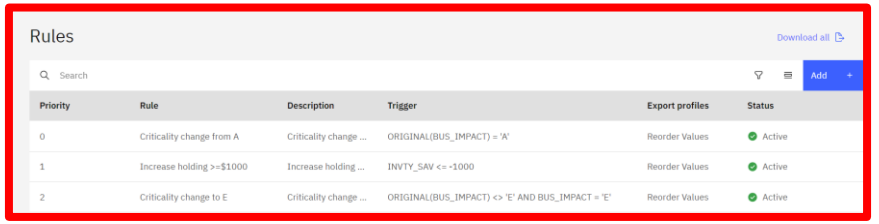
Auditable approvals process for nontrivial changes using Workflows

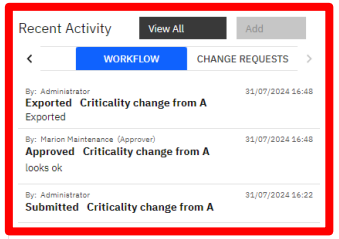
Standardize approvals process across the business. As simple as setting the rules and assigning reviewers and approvers.

- Requested changes summarized in single view to allow processing in bulk
- Process is auditable and aligned to delegated authorities
- Approvals tracked inside MRO IO – reduce reliance on emails and spreadsheets
- Reviewer and approver can add notes
- Scheduled reminders for outstanding requests





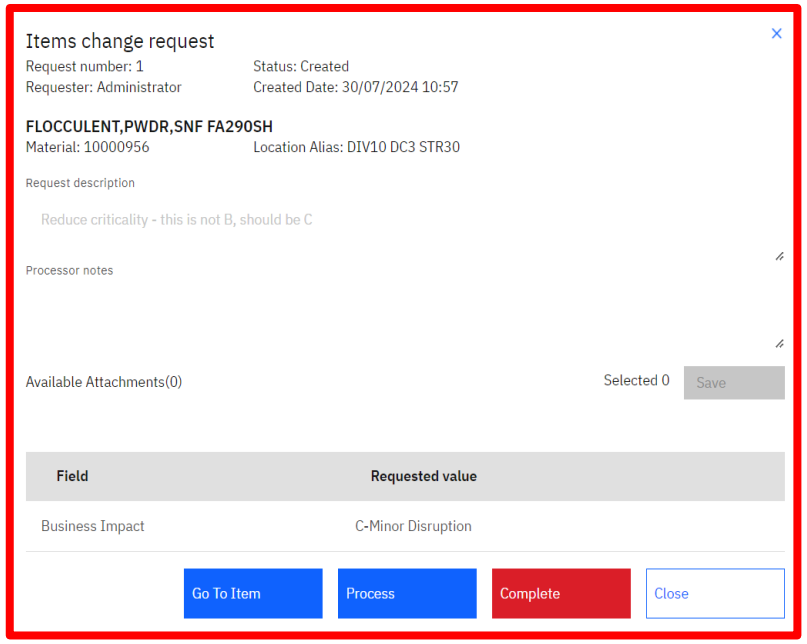


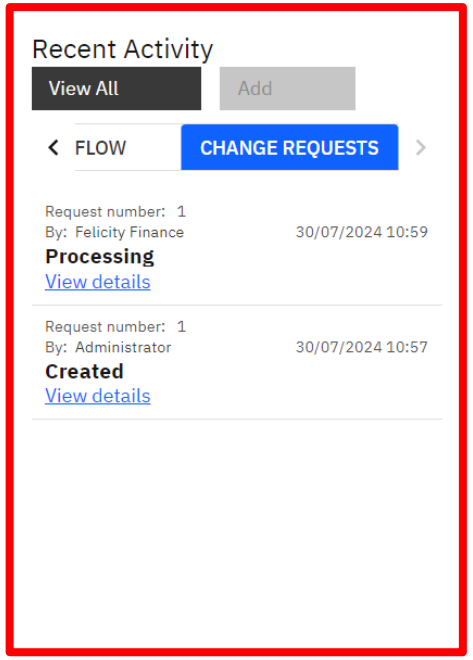


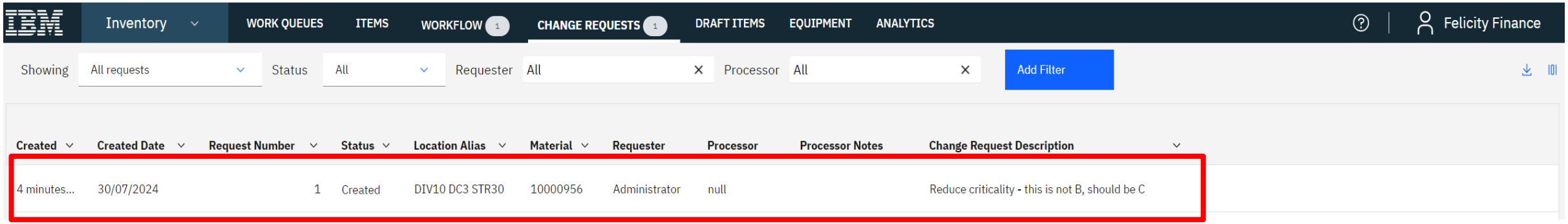
Manually triggered reviews processed using Item Change Request

Manage manual requests for change by users

- Standardized process across business
- Auditability and traceability of requests



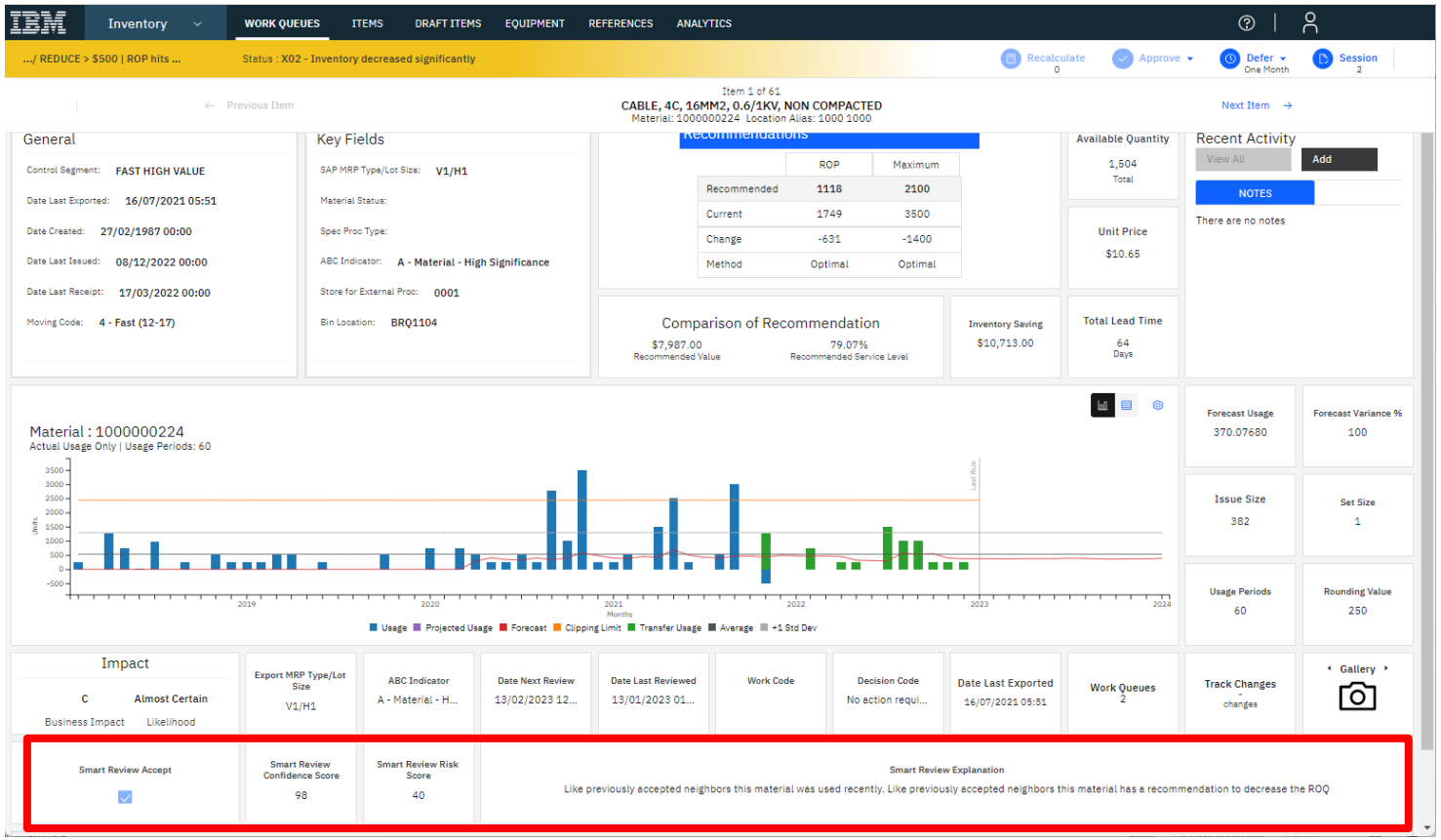


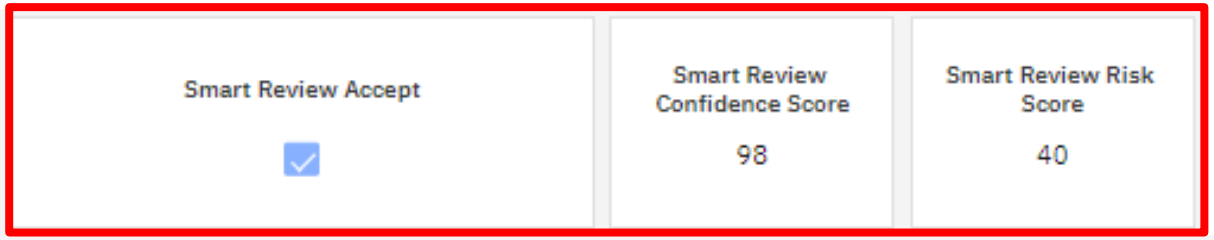


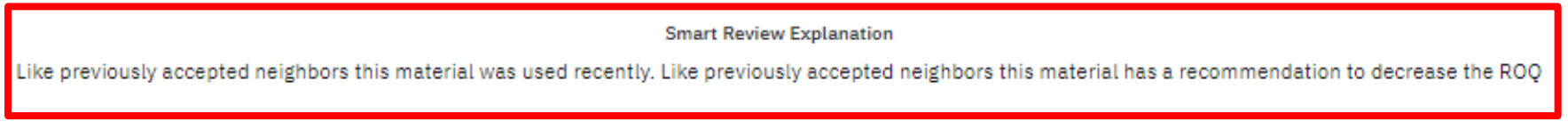
AI Use Case: Smart Review

AI powered assistant, an additional resource “looking over your shoulder” to help make decisions.

- **Smart Review Accept:** If **True**, AI model predicts recommendation will be **Accepted** based on the latest month data. Otherwise, it needs a **Review**.
- **Smart Review Confidence Score:** Confidence score for Smart Review Accept.
- **Smart Review Risk Score:** It is the risk-ranking based on ‘Business Impact’ and ‘Likelihood Code’.
- **Smart Review Explanation:** Natural language explanation of Accept/Review.
- **Automated:** Advice can be fully automated







MRO Inventory Optimization “Smarts”

Uniquely packaged in one solution to improve spares availability, increase equipment uptime and reduce costs

Provides continuous, sustainable, consistent optimization by combining:

+ Client Data (Items, Equipment, Suppliers, BOMs, Issues, Receipts, Work Orders)
+ Prescriptive Analytics & Algorithms
+ Client-Based Logic Configuration

Data Enrichment	Item Characteristics	Demand Forecasting	Availability/ Lead Time	Item Criticality	Risk-Based Cost Model	Workload Prioritization/Efficiency
Lead Time	Automated Segmentation	Historical Demand	Internal PR-to-PO	5 Levels of Business Impact	Stockout Risk	Prioritized Work Queues
Criticality	Movement Stratification	Planned Demand	Weighted Average PO-to-Receipt	Equipment Linkage	Holding Cost	Item-Level Scoring
Potential Duplicates	Bin Constraints	14 Forecasting Methods	Receipt-to-Put Away	Material Type & Class	Expediting Cost	Workflows
Average Issue Size	Set/ Pack Size	Forecast Scoring/Selection	Outlier Clipping	Supplier	Replenishment/ PO Line Cost	Fully Automated Recommendation Process
Data Anomaly Alerts	Average Issue Size	Historical & Future Durations	Variance Factoring	Cost	Economic Order Quantity	Excel Import / Export
Missing Data Alerts	Shelf Life	Automated Clipping	Supplier Performance	Description	Safety Stock	On-Line Grid Format Drill Down
Where-Used Issues/BOMs		Forecast Factoring	What-If Overrides	Availability		User-Specific Filters and Views
			ERP Stated	Movement		

IBM MRO IO Customer Successes

One of World's Largest Aluminum Manufacturers

MRO Inventory Rebalanced by

$37M (33%)

In Year One

- Maintenance driven initiative to reduce inventory
- $23M net inventory reduction in first 12 months
  - $30M inventory reduction
  - $7M inventory increase to minimize downtime
- Improved both asset uptime and service levels in the first 12 months

Major Mining Company

MRO Inventory Reduced by

$52M (71%)

Over Six Years

- Operating 7 mine sites, and 1 terminal
- MRO Inventory Value decreased from $73M to $21M over 6-year period
- Achieved 50% year over year reduction in inventory for 6 years
- Improved asset uptime

Large Electric Utility

MRO Inventory Rebalanced by

$33M (25%)

In Year One

- Reduced inventory growth from 10% to 0%
- Improved asset uptime
- Net $77.8M spend avoidance over 5 years
- Critical spares service level for generation improved to 99.7%

One of World's Largest O&G Companies

Reduced Working Capital

10%

In Six Months

- Maintenance driven initiative to reduce inventory
- Lowered inventory levels by at least 10% for three years in a row
- Achieved over $90M in savings through rebalancing over three years
- Savings at single site funded global implementation in year 1

Ask: Achieve the outcomes that you desire

Assets

- Increase asset productivity and economic output
- Increase service reliability and economic output
-
- Reduce cost of planned and unplanned downtime
- Extend economic life of assets and equipment

Costs

- Reduce external maintenance vendor spend
- Increase MRO inventory productivity
- Reduce cost of asset decommissioning and disposal
- Reduce ALM platform total cost of ownership (TCO)

Risk

- Reduce compliance process and regulatory cost
- Reduce service-level agreement (SLA) penalties
- Optimize risk-based asset investment spend

Workforce

- Increase operations and reliability engineering productivity
- Increase maintenance supervisor and staff productivity
- Reduce cost of inspections and quality