

# ORACLE WAREHOUSE MANAGEMENT SYSTEM

IMPROVING INVENTORY ACCURACY BY INFLUENCING EMPLOYEE BEHAVIOR  
USING WAREHOUSE MANAGEMENT SYSTEM RULES BASED ENGINE

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## The Challenge

Inventory inaccuracy is a nightmare for any warehouse and if left unchecked, inventory errors can lead to a negative feedback cycle of declining productivity and increasing inaccuracies. Inventory inaccuracy leads to a downward spiral where warehouse productivity declines and feeds even more inaccuracies in the system. Left to itself, inventory inaccuracy erodes profitability and warehouse efficiency via:

**Poor customer service** when a wrong product is shipped to a customer or a wrong delivery date is promised.

**Increase in Backorders** because the Available to promise (ATP) system thinks there is plenty of stock either on-hand or on-order.

**Lost productivity** when operators run around looking for missing products.

**High product obsolescence** when the missing products are “found” but too late to be of any use.

**Direct hit to profitability** when there is an inventory write off.

**High inventory levels** because you need the extra safety stock to hide the inaccuracies.

**Inefficient warehouse usage** when you need to stop warehouse operations to carry a physical count in order to satisfy auditing requirements.

The costs of negative (or positive inventory) variances are steep, and it's not just the company's reputation at stake. For negative inventory discrepancies, companies pay expediting fees to fulfill demand, laying out cash that digs right into the bottom line. For positive inventory variances, companies are carrying inventory that could be sold, adding capital costs as well as exposing them to unrealized revenue. Positive variances of time-sensitive products increase the potential for write-offs and losses. In both cases, inaccurate information causes poor decision-making, and undermines a company's investment in their ERP software. This, in turn, feeds off inventory data for MRP / Advanced Planning, procurement, and financial modules.

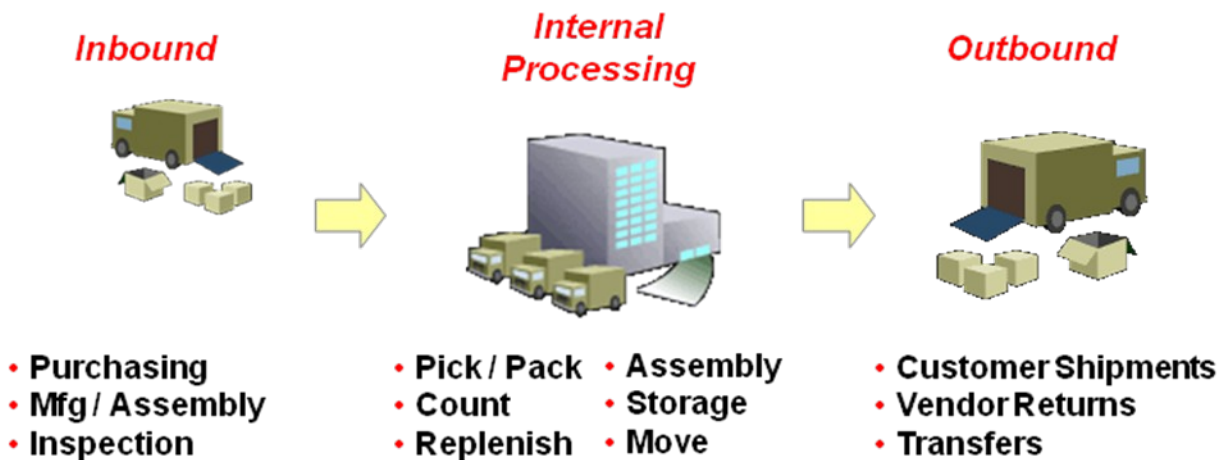
## The Solution

Most organizations have well defined business processes they train their employees and they hope the result is more accurate inventory for the organization. However employees may or may not follow the business processes. Business organizations need a method to enforce training on the job in the warehouse to improve the likelihood employees will follow accurate warehouse operational procedures.

Motion International configured Oracle Warehouse Management System rules engine to reinforce operational processes learned in training on the job. This white paper gives an introduction to Oracle's Warehouse Management Rules Engine and how this functionality can be used to influence employee's behavior on the job and result in more accurate inventories.

## Introduction to Oracle Warehouse Management System

A warehouse consists of area, equipment, items, devices and people. Within this warehouse the processes of purchasing, receiving, put away, storage, value added services, picking, packing, and shipping are constantly taking place. To aid in this endeavor, Oracle has expanded its warehousing capabilities via the use of their Oracle Warehouse Management System module (Warehouse Management System). The Oracle Warehouse Management System is a component of Oracle's Supply Chain Management and Manufacturing solution. It spans the areas of warehouse resource management, warehouse configuration, task management, advanced pick methodologies, and value added services. Oracle Warehouse Management System optimizes the material handling business processes for warehouses, manufacturing facilities, and distribution centers, as well as, providing integrated barcode scanning and label generation to improve material transactions and advanced shipping process.



**Note:** To use Oracle Warehouse Management System, you must implement the Inventory, Purchasing, Bills of Material, and Order Management modules.

A supply chain consists of three parts – procurement of raw materials and semi-finished products, converting them into finished products, and distributing them for sale. In this context, supply chain inventory management implies that the inventory should be managed in A crucial part of supply chain inventory management involves managing warehouses. It helps in the proper storage and transportation of raw materials to production units, as well as the distribution of finished products through a chain of retailers and wholesalers. Poor supply chain inventory management could spell disaster for any company. The higher the inventory investment as a percentage of total assets of a company; the higher the damage caused by poor inventory management. To ensure that this does not happen, Oracle Warehouse Management System uses a user defined rules engine coupled with its Advanced Task Framework to ensure inventory accuracy.

## Oracle Warehouse Management Rules Engine and Strategies

Oracle Warehouse Management System can provide rules driven processes meaning that flexibility meets needs without customizations. The res driven processes eliminates customizations, can easily be changed or evolved, increases long-term flexibility, and accelerates implementation. Rules driven processes are supported for directed picking, directed put-away, task assignment, costing, and labeling.



Through Oracle Warehouse Management Systems Rules Engine, companies can enforce proper work processes taught in training on the job. As employees interact with Oracle Warehouse Management System, they are fed instructions and tasks that follow a predefined work processes based on conditions found in the warehouse.

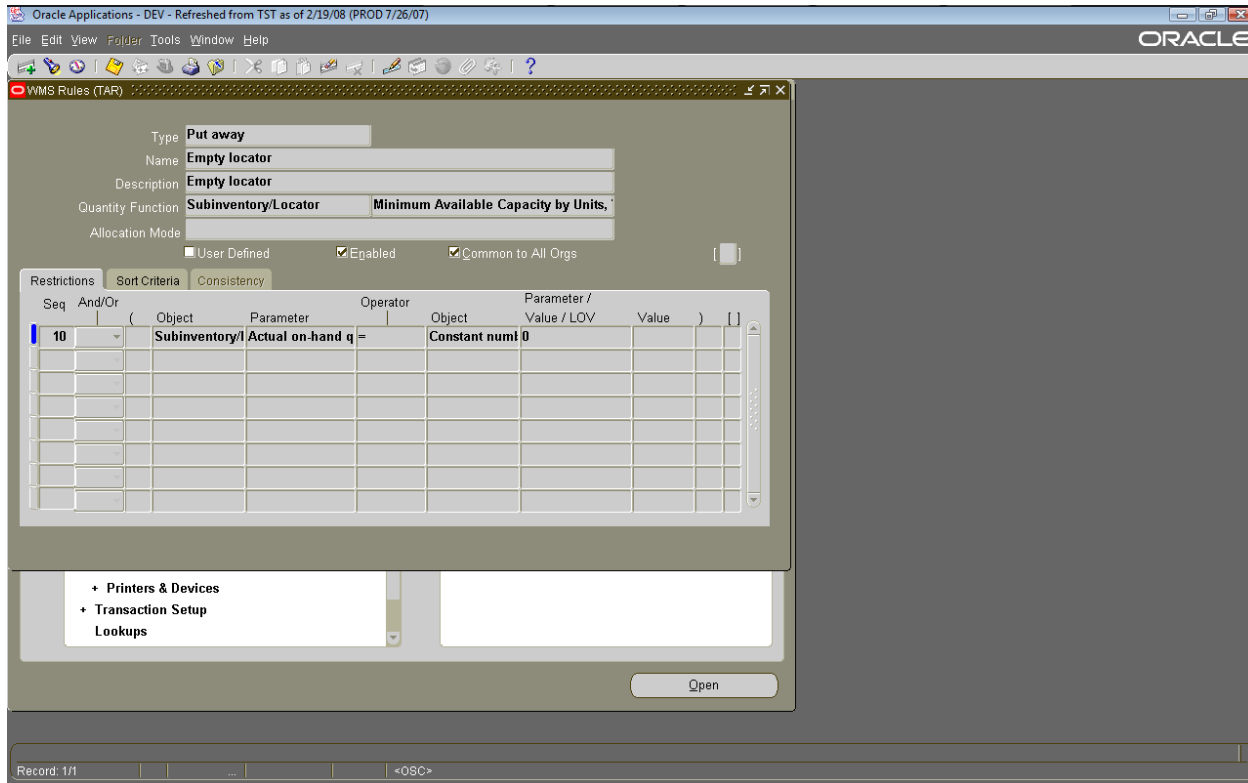
You can use the rules engine to create six different types of rules, including picking, put away, task type assignment, cost group assignment, label format assignment, and operation plan assignment in a Warehouse Management System enable environment. Oracle Warehouse Management System is seeded with several default rules including an empty locator rule which allows for material to be put into the locator only if there are no other items in the locator. Rules must be defined in a strategy and enabled using the rules workbench.

The most difficult part of setting up the Rules Engine is not defining the rules in the application, but rather, defining the business logic that needs to be modeled. This process of defining the business logic and creating the rules and strategies requires thorough knowledge of the other Oracle modules that are affected via these rules and a technical resource to aid in the writing of the rules. However, some warehouses have very simple needs that can be met via generic rules and strategies. For instance, a First In First Out rule that ensures stock rotation is used is already seeded within the application.

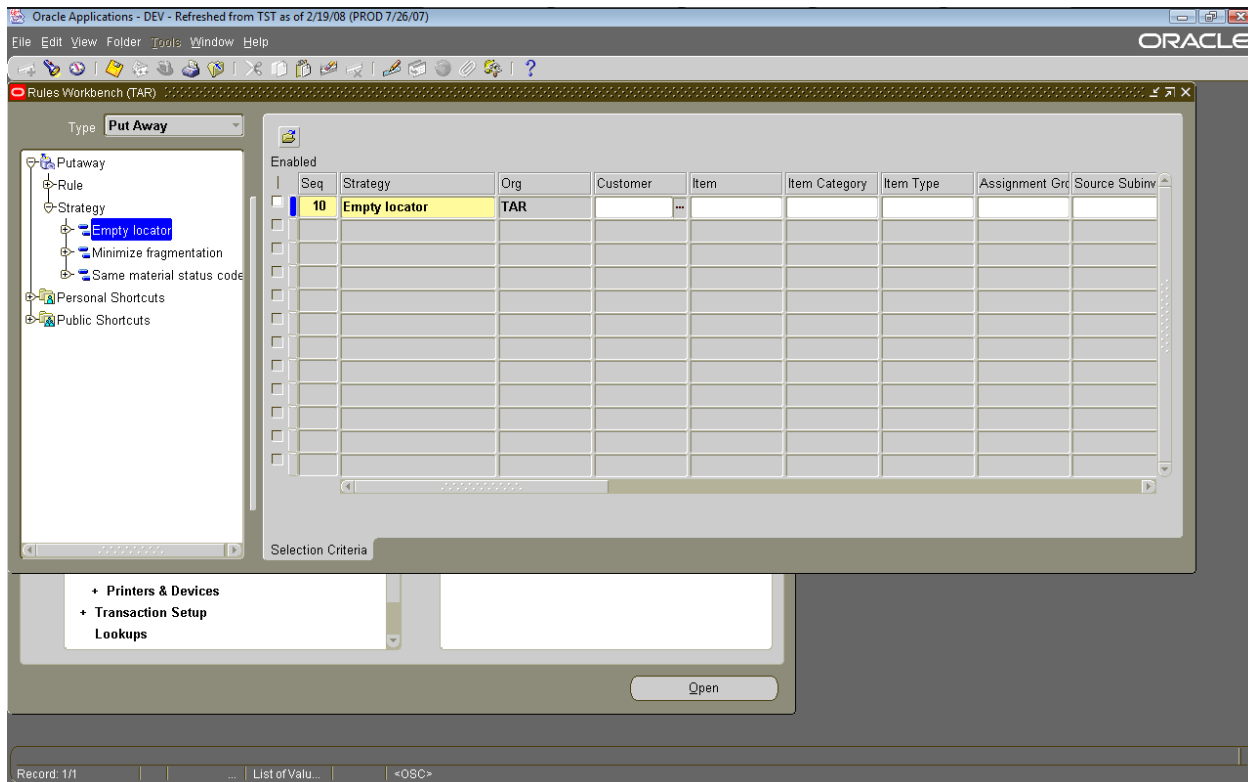
### Rules Workbench

The Rules Workbench is used to create rules to effectively dispatch tasks and manage inventory. You can use it to streamline picking and put away of material, assign newly received material to a cost group, ensure customer complaint labeling, assign tasks to a resource with the appropriate training and equipment, and select the correct operation plan for tasks. You can create rules based on nearly any attribute in the database, including flexfields you define.

### The Warehouse Management System Rule Empty locator



### The Empty locator rule is added to the Rules Workbench

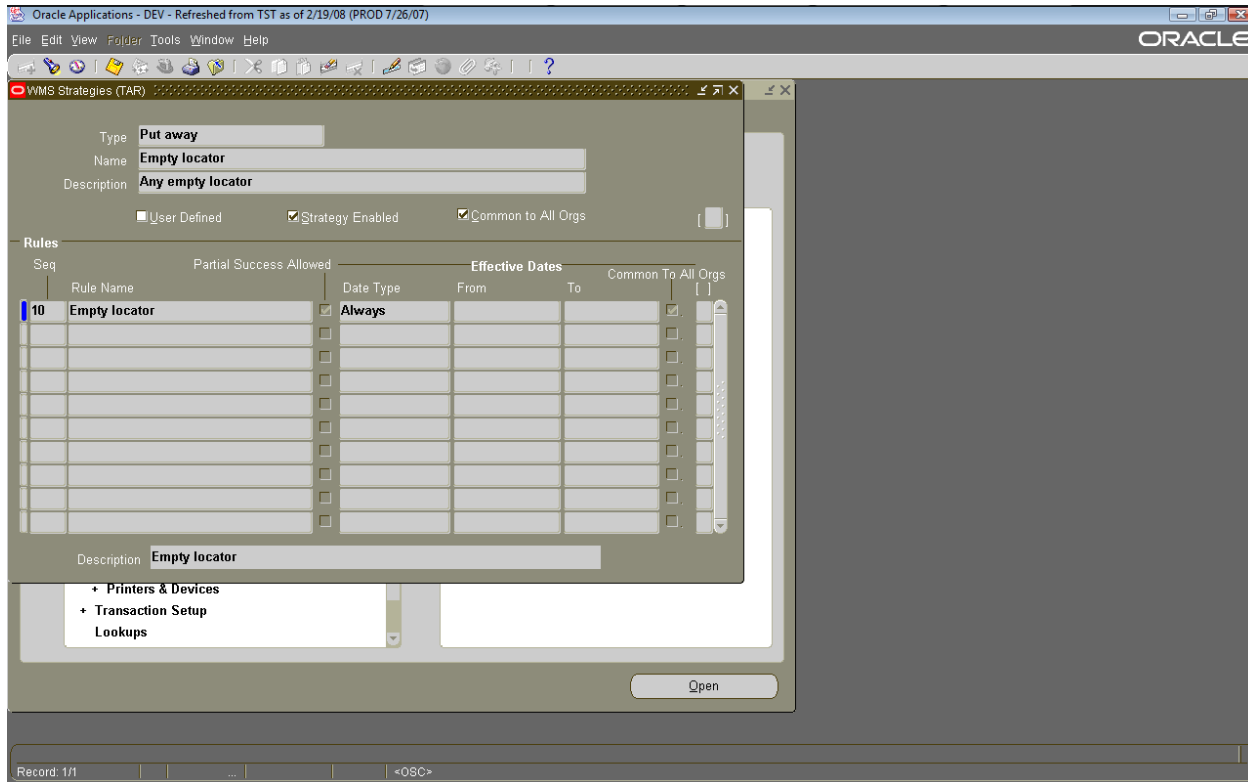


### Warehouse Management System Strategy

A strategy is a sequence of rules the rules engine runs to try to allocate material, allocate space, or fulfill a request. Picking, put away and cost group assignment rules use strategies. You construct strategies in the Strategies window from one or more rules. You can reuse rules for multiple strategies. If a strategy cannot find enough material to fulfill a pick or find enough space for a put away, the material is backordered or the put away fails.

### Warehouse Management System Strategy

*The Empty locator rule is enabled in the Warehouse Management System Strategy*



Oracle’s Rules Engine and Warehouse Management System Strategy allow organizations to extend the training on proper work processes from the classroom to the warehouse floor and direct employee’s behaviors.

## Influence Employee Behavior By Providing Key Measurement and Feedback on Warehouse Operations

Oracle Warehouse Management System provides for daily business intelligence Key Performance Indicators (KPI's) with access to real-time and complete business information. With this information, employees receive real time feedback on activities they perform and their impact on KPIs for warehouse operations.

The screenshot shows the Oracle Warehouse Management System interface in Microsoft Internet Explorer. The browser title is "Warehouse\_Management - Microsoft Internet Explorer". The page header includes "ORACLE Warehouse Management" and navigation links like "Navigator", "Home", and "Logout".

At the top, there are filters for "O1 FY04 Day -2 Mar 29, 2004", "Period Type Rolling 90 De", "Compare To Prior Year", and "Organization All".

**Warehouse Management KPIs:** A table lists key performance indicators with their current values and trends over time:

Name	Value	Trend
Pick Release To Ship (Hours)	3.1	-3.1
Receipt To Putaway (Hours)	85.3%	1.1
Volume Utilization	59.7%	2.4
Task Exceptions Rate	6.8%	-0.5

**Pick Release To Ship Time Trend:** A bar chart comparing "Prior" (light blue) and "Pick Release To Ship (Hours)" (dark blue) across four dates: 3-Jul-03, 1-Oct-03, 30-Dec-03, and 29-Mar-04.

**Pick Release To Ship Time Table:**

Source Subinventory	Ship Confirms	Change	Pick Release To Ship (Hours)	Change
FGI (M1)	792	-2.6%	2.1	2.1
Stores?	676	3.1%	2.7	2.7
Restricted?	577	1.7%	2.9	2.9
Finished?	284	-2.6%	3.7	3.7
Stores-2?	412	-3.9%	4.2	4.2
Floor Sto?	63	-59.4%	66.0	65.2
<b>Grand Total</b>	<b>2,804</b>	<b>-5.6%</b>	<b>3.2</b>	<b>3.2</b>

**Receipt To Putaway Time Trend:** A bar chart comparing "Prior" (light blue) and "Receipt To Putaway (Hours)" (dark blue) across four dates: 3-Jul-03, 1-Oct-03, 30-Dec-03, and 29-Mar-04.

**Receipt To Putaway Time Table:**

Destination Subinventory	Putaways	Change	Receipt To Putaway (Hours)	Change
FGI (M1)	723	2.6%	2.6	-5.1

**Links:** A list of navigation links including "Customer Fulfillment Management", "Shipping Management", "Inventory Management", "Manufacturing Management", "Plan Management", "Product Cost Management", "Transportation Management", "Expense Management", and "WMS Management".

**Additional Links:** "Lines Shipped", "Lines Shipped Late to Schedule Summary", "Past Due Schedule Line Summary", "Delivery Performance", "Delivery Performance Trend", and "Freight Intransit Time".

**Additional Links:** "Receipt Item Quantities", "Return Transactions", "Inventory Value Summary", and "Intransit Inventory Detail".

Red callout boxes highlight specific features: "Flexible Time Periods", "Flexible Comparisons", "Real-Time Results", "Performance Measures", "Reports", "Links", and "Graphs".

This and other graphics were supplied via various Oracle presentations given at an OUAG conference

## Performance Management Tools

Oracle Warehouse Management System has built-in performance management tools that enable a warehouse manager to proactively manage warehouse performance. Using the Control Board management can view the current status, perform transactions and calculate availability via Materials Workbench, monitor and refine facility activity via Control Board, provide real-time status with active alerts and notification messaging, handle last minute changes with workflow exceptions, and keep key personnel informed with multiple reporting options.

Task	Priority	Employee	Status	User Task Type
178	1	Seconi, Ms. F	Loaded	REPL
238		Hilovsky, Mr.	Dispatched	
245		Hilovsky, Mr.	Loaded	
243		Parker, Mr. W	Dispatched	
304		Smith, Mr. K	Loaded	CASE
			Pending	EACH
			Pending	EACH
3		Parker, Mr. W	Completed	REPL
95		Tilton, Mrs. C	Completed	
119		Seconi, Ms. F	Completed	

Refresh

Task Details Exceptions Performance

## Advanced Inventory Capabilities

Using Oracle Warehouse Management System a warehouse will be able to obtain a single source of truth for all inventory. The warehouse will be able to maintain accurate, real-time inventory information via RF physical inventory measurement and RF Cycle Counts. The warehouse will manage inventory levels using automated replenishment, Kanban management, and transfers between facilities. The warehouse will now also be able to support advance tracking capabilities using Warehouse Management System' material status control, inventory ownership tracking and lot, serial, and LPN control.

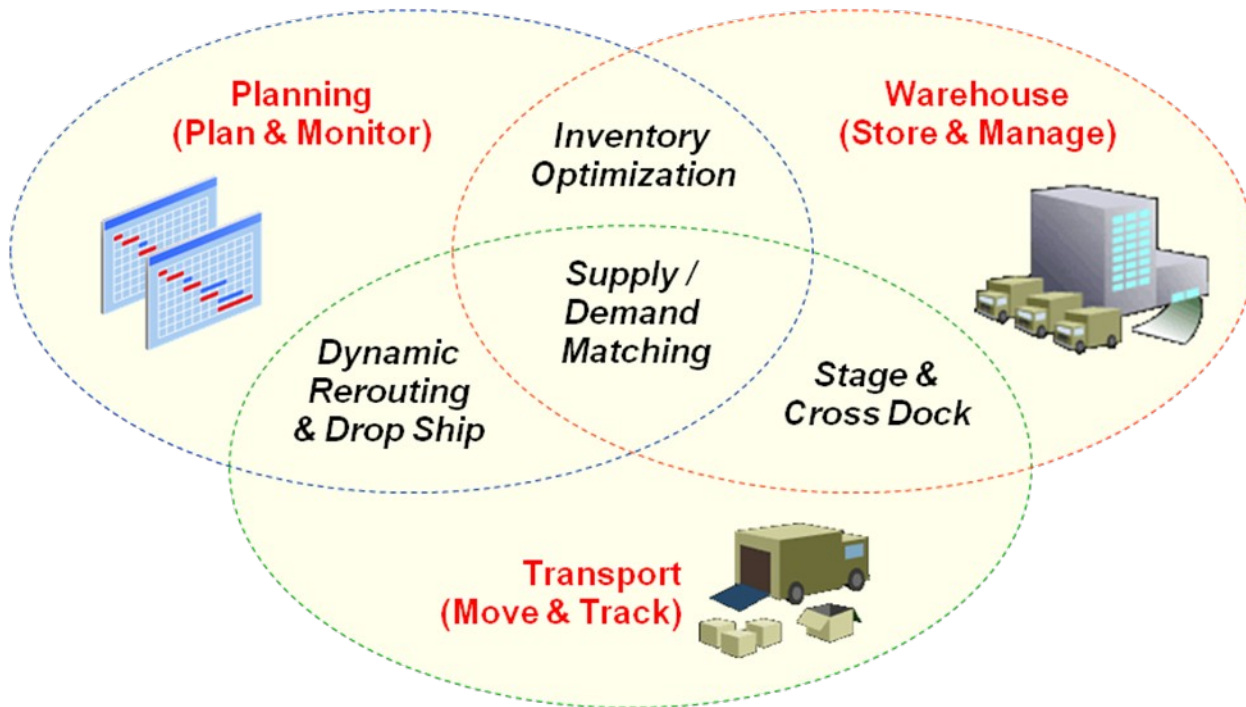
## Conclusion

Oracle Warehouse Management (Warehouse Management System) enables companies to maximize their utilization of labor, space and equipment investments by coordinating and optimizing resource usage and material flows across a global supply chain on a single platform.

Oracle Warehouse Management System has a rules and strategy workbench. On this workbench, business organizations are able to configure Oracle Warehouse Management System to provide work instructions to employees based on the warehouse conditions they encounter. These work instructions can be extensions of lessons learned in job training events.

Oracle Warehouse Management Systems also has robust on-demand reporting capabilities and tracking of Key Performance Indicators. This information management solution provides timely feedback to employees so they better understand how tasks they perform impact Key Performance Indicators of warehouse operations.

With this combined functionality, Oracle Warehouse Management System offers business leaders with a tool to influence employee's behavior to impact inventory control.



## About the Author

Ian Gramaccioni is a Senior Oracle Business Analyst with Motion International. Mr. Gramaccioni has over twelve years experience in designing and implementing business improvement strategies using Oracle functionality. Mr. Gramaccioni has served as Functional Subject Matter Expert, Business Process Lead Role, and Project Manager on large scale Oracle implementation projects. Ian Gramaccioni has successfully restructured global supply chain operational processes to maximize efficiencies and eliminate waste in the global supply chain.

## About Motion International

Motion International is an experienced, exclusively Oracle professional services company that works with manufacturing and retail firms with international operations. One of very few firms that offers high-caliber multinational Oracle expertise worldwide, it has developed several proprietary best practices, tools and methodologies to ensure successful delivery. Headquartered in Minneapolis, Motion has delivered Oracle projects on five continents. Its clients include some of the world's largest global companies.

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