CONSOLIDATING YOUR WAREHOUSE MANAGEMENT SYSTEMS

Standardized processes and integrated software environments improve efficiencies, cut costs, and deliver higher visibility into the supply chain.

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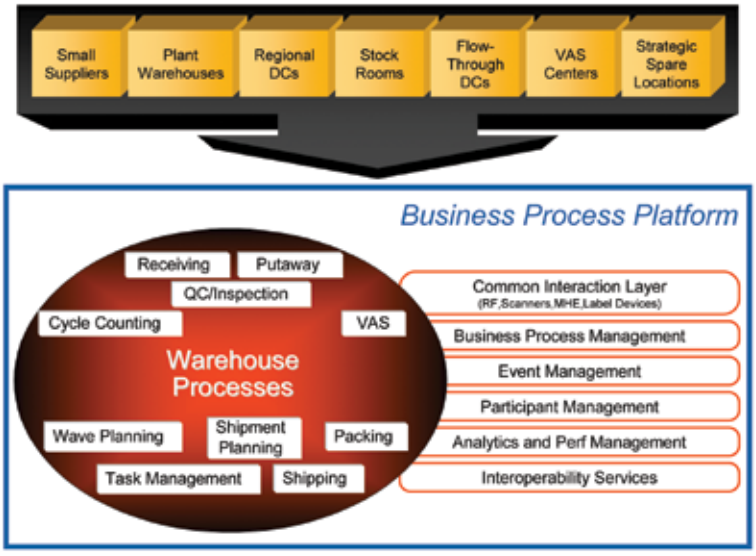
Companies often have complex warehousing environments, with inventories being managed at multiple, dispersed facilities. This situation often results in a non-federated structure where each facility ends up employing different operational processes and deploying differing systems. The end result is increased complexity in managing operations, a lack of centralized visibility, and higher infrastructure and ownership costs due to complex systems integration. As a result, many companies are beginning to consider the standardization of warehouse management processes. Crucial to this strategy is the consolidation of the warehouse management system (WMS) that unifies various solutions.

The principal challenge is to efficiently and effectively execute the consolidation strategy while retaining the local character of specific warehouse operations. That's because warehouses typically serve a local clientele, where process localization and customization are usually necessitated by the need to cope with business practices, stock keeping unit (SKU) distribution, volumes handled, item velocity, availability of material handling equipment (MHE), local holidays, labor policies, etc. Hence, the WMS consolidation strategy requires localization of functionalities from a universal collection of standardized processes.

Modern Warehouse Management Systems

WMS solutions have evolved from packages that automated and enabled basic singular execution strategies into complex solutions that can be support numerous processes within a single architecture. Usually, a single process platform is deployed to manage a number of end-to-end business processes, many of which extend beyond



traditional business boundaries. The term 'WMS Fusion Architecture' is increasingly gaining currency to describe this characteristic of WMS.

In a fusion WMS, all stakeholders, locations, processes, and activities, are co-located in a common database that provides the following capabilities for setting up an organizationally diverse, multi-echelon distribution network:

- Process management for each warehouse location, with an embedded alert and event management functionality
- Ability to model facilities serving disparate warehouses while accommodating organizational diversities and boundaries
- Integrated visibility across business process tiers through linked entities (like orders to shipments, shipments to task level shipment processing sub-activities like Pick-and-Pack).
- Inventory visibility at multiple levels (case/ pallets) for SKUs
- Consistent interaction across multiple mobile channels like Personal Digital Assistants (PDA), Radio Frequency (RF) Terminals, and Windows CE operating system-based terminals, etc.
- Ability to inter-operate with Service Oriented Architecture (SOA) enabler backbones and connect to unified applications like order capture, order processing, and master data management.

The business imperative to unify WMS applications has driven many companies to actively explore this "fusion" genre of products with a view to rationalize the cost of hardware and software investments. While there are a number of advantages to having a global single instance WMS platform, the solution may not be appropriate or viable solution for all locations and stages due to issues in performance and ownership.

Networked Warehouse Management

The widespread adoption of the WMS fusion vision and the emergence of packages that provide warehouse management process execution and tracking capabilities has resulted in a new concept called Networked WMS (NWMS) solution.

NWMS is designed for managing fulfillment and distribution across a network of facilities. The network includes central and regional distribution centres, local fulfillment centres, stock rooms, plant warehouses, returned material centres, and any physical/virtual entity configured as a fulfillment node. It helps businesses manage inventory and processes throughout their network through a synchronized WMS.

NWMS is process-centric, alerting everybody of critical events occurring within the network. This allows fulfillment decisions to be based on real-time information received from customers, partners and suppliers. It enables responsive customer order fulfillment, improved operational efficiency, greater flexibility for growth, and a lower total cost of ownership in large scale, complex, fulfillment environments.

NWMS can be leveraged across all types of inventory stocking situations, from the largest facilities to the smallest stocking locations. Its functional capabilities allow one instance of the software to be simultaneously deployed in multiple facilities, and operate locally or in networks.

WMS Deployment Options

Different kinds of WMS deployments can be evaluated after constructing a comprehensive WMS solution eco-system. This eco-system not only contains components resident within the WMS application, but should also encompass various human, robotic, and interfacing systems, that complete the WMS operational landscape.

Factoring this extended landscape into the solution will often mean adding more design parameters. One such parameter is "Interleaving." In a WMS-robotic system (MHE) integration there are situations where the process activity sequence involves multiple request-

Benefits of Consolidating WMS

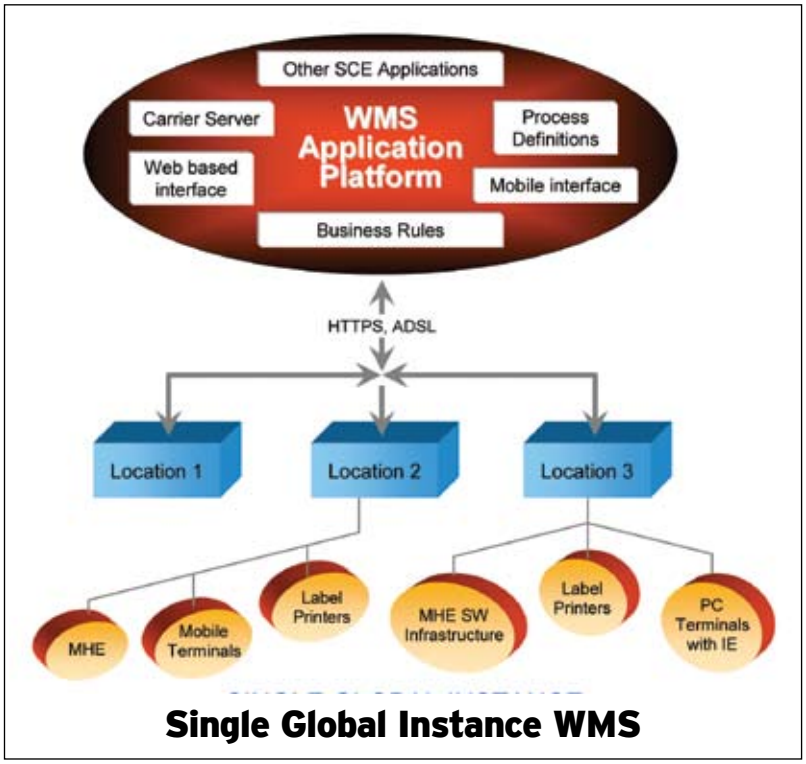
- Reduced order fulfillment costs
- Increased asset utilization
- Improved customer satisfaction
- Reduced deployment time for process changes
- Reduced order cycle time
- Simplified integration of systems across networks
- Increased person/equipment productivity levels
- Improved inventory accuracy
- Adherence to various compliance requirements
- Increased effectiveness in logistics function

response interactions between WMS and MHE systems. This concept is referred to as 'Interleaving.' Interleaving leads to the MHE system waiting for WMS to respond in time during intermediate processing steps, and places a unique response time demand on the WMS solution. It is important to keep the robotic idling minimal to prevent any loss of operational productivity. Addressing high levels of interleaving imposes network restrictions affecting the WMS instance decision. Based on these considerations, we suggest three strategy options for consolidating global WMS: Single Global Instance, Distributed Instances, and the Hybrid Approach.

Single Global Instance

A single instance strategy is always the first choice when:

- visibility, tracking, and event information, across the distribution network is vital
- there is a standardized set of definitions across different locations
- there is standardization of automation equipment across locations (allowing for the same technology interface to be re-used)

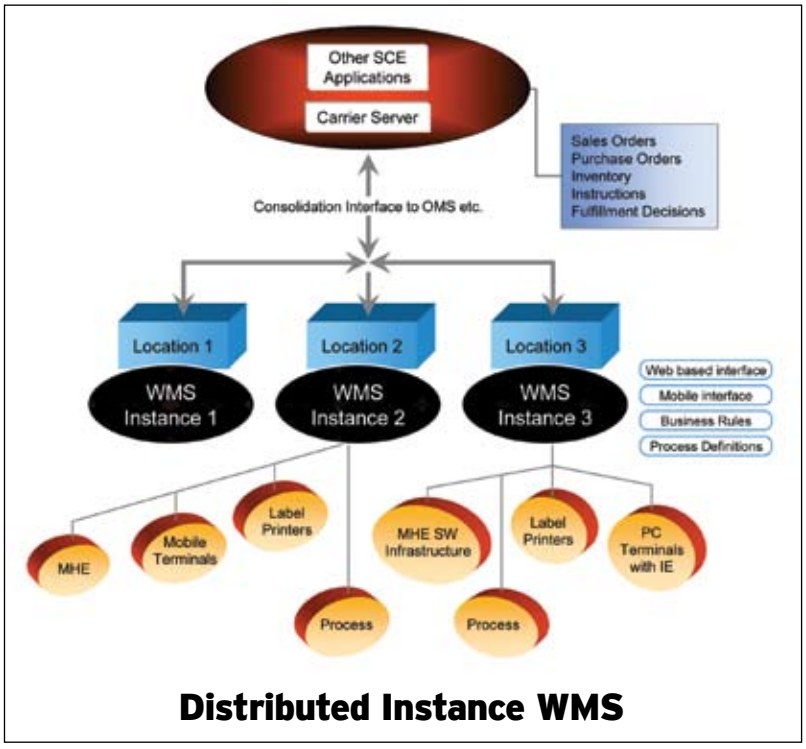


Single Global Instance WMS

Distributed Instances

A distributed instance strategy is appropriate when;

- localization of warehouse level activities is high
- there are significant differences in manual and automated activities across facilities
- there are widely varying automation technologies found across facilities. For example, one facility uses robots for palletization during receiving, while the other does not, but makes extensive use of conveyor systems
- there is strong interleaving between WMS and robotic systems. This demands an instant response from WMS about next task advices. If the advice is not returned by the WMS in time, the MHE would idle.

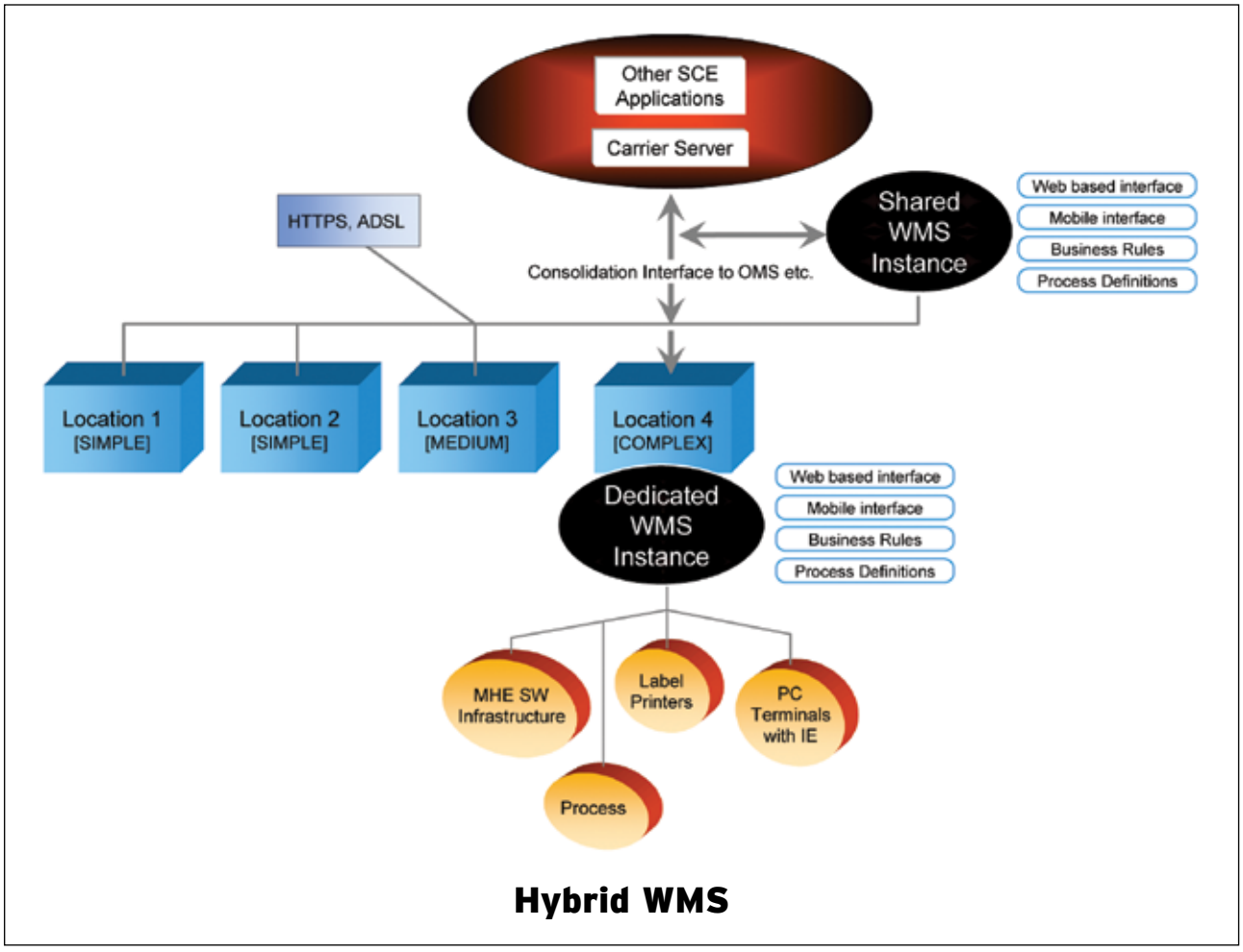


Distributed Instance WMS

Hybrid Approach

A hybrid approach combines the benefits of both, distributed and single instances, and would be appropriate for complex scenarios that need visibility across distribution networks, and still address the needs of large scale localization and process complexity at the warehouse level. This approach provides the flexibility to handle complex activity-level interleaving between WMS and robotic systems by local hosting, and also address the needs of smaller facilities with rudimentary IT infrastructures.

Another situation could be where business rules are localized at the warehouse level. At the company level, these rules may be applicable for all locations and ware-



Hybrid WMS

houses. At the warehouse level certain business rules could be specific to that warehouse and may override rules defined at the company level. For example, all physical warehouses need to follow certain standard picking rules, set at the company level. But for a specific warehouse (or even a zone within a warehouse), this rule can be customized and deployed as a local business rule (dedicated WMS instance).

Hybrid strategies are best handled by forming logical clusters arrived at grouping facilities/locations following similar processes geared to attaining a certain level of uniformity of infrastructural needs. These warehouse clusters can then be hosted on shared hardware platforms/hardware consolidation solutions. The hybrid hosting model itself can be of different topologies and the approach to hybridization should be strongly connected with enterprise wide supply chain consolidation vision. But, this approach needs better IT-business strategic monitoring to be successful.

The Right WMS Strategy

Since global WMS consolidation initiatives are often progressive in nature, any WMS consolidation strategy decision would need to be flexible and evolutionary. Throughout their lifecycles, warehouses can go through various levels of operational maturities. Initiating at a basic level (without leveraging cutting-edge technologies or state-of-the-art processes), and gradually moving on in terms of automation, leveraging latest technology (e.g. introduction of robotic conveyors or RF), to the final stage of attaining process maturity/ coverage (e.g. addition of cross-docking).

A winning instance strategy would be the one that is "just about right" in terms of provisioning for cost at a given point in time, and would provide "just what is needed" in terms of ability to address peaks in transaction volumes. The optimal strategy would also provide opportunities for expansion/evolution using budgetary allocations derived from earned profit as the roll-out consolidation program crosses significant milestones. ■

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