



Inventory Allocation

The concept of inventory allocation was discussed briefly in the article *What is a WMS?* This article explains inventory allocation in more detail; what it is and how it works. The goal of this article is to help the reader understand the concepts and terminology of inventory allocation.

Inventory allocation is a key capability of a warehouse management system (WMS). Inventory allocation is the process of determining the bin from which inventory is to be picked to satisfy an order. The order may be a sales order, production order, warehouse transfer order, kitting order, service order, counter sales order, rework order to send inventory outside to a vendor for processing such as plating, painting, cleaning or patching, or to satisfy a bin replenishment requirement. Bin replenishment will be explained in a separate article.

At the most basic level the operator picking inventory for an order performs inventory allocation by choosing the bin from which to pick the inventory. The bins that contain the item in the proper package configuration could be listed on a pick list. Some business software that does not have a WMS allows a person to choose the bin from which inventory is to be picked before the order is released to the warehouse. The specific bin from which the inventory is to be picked is then printed on the pick list. This article addresses inventory allocation performed by the WMS.

The WMS performs inventory allocation when an order is released for picking. Making an order available to the WMS and releasing an order for picking are two separate actions. Many business software packages inadvertently combine these actions. Releasing orders for picking and the picking process are the topics of separate articles. All discussion of inventory allocation is with respect to a single location (warehouse or distribution center). An item in a specific package type at a given location will be referred to as a SKU (stock keeping unit) for the remainder of this article.

The benefits of inventory allocation performed by the WMS are:

1. The WMS consistently follows inventory selection rules to rotate inventory, meet lot requirements, meet packaging requirements, and improve space utilization
2. It is faster than an individual performing allocation
3. It makes picking faster compared to the operator choosing the inventory to pick; the operator is directed to a single bin for each pick
4. It is more accurate
5. It supports paperless picking

Inventory allocation must consider a variety of criteria when choosing the bin from which to pick an order line. Not all WMS software handles all of these criteria and not all



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criteria apply to all distributors. Each WMS handles the criteria most important for the distributors it serves:

1. Inventory age – could be oldest first or there could be an age limit depending on the type of order; in rare circumstances newest first might be required for a certain type of order.
2. Packaging – could be specified on the order (10,000 pieces in boxes of 2,500 pieces), on a contract (replenish with bags of 50 pieces each), or the WMS could split an order line into multiple picks to take advantage of available inventory (line for 5,600 pieces – one carton of 5,000 pieces and six boxes of 100 pieces).
3. Lot requirements – a customer could specify limits regarding the lots they would accept on an order for lot controlled items (single lot, no more than two lots, same lot as last time, or a specific lot number) or the distributor or an industry could have standard lot processing rules.
4. Country of origin – a customer could specify inventory from a specific country of origin or not from a specific country of origin.
5. Dedicated bin for a SKU – the WMS could allocate inventory from overstock rather than the dedicated bin for an item if the order quantity exceeds a set percentage of the dedicated bin capacity. For example when a dedicated bin holds 20 boxes of a SKU; pick an order for 10 or more boxes from overstock rather than deplete the dedicated bin.
6. Rounding – the order quantity could be rounded up or down to match standard package sizes; this is most common for production and transfer orders.
7. Deliberately ship short – less than the quantity ordered could be allocated specifically to use up partial packages; this is most common for vendor managed inventory programs and dedicated bin replenishment.
8. Empty bins vs. fewest picks – this rule comes into play when the WMS has a choice between allocating the inventory for a SKU from a single bin or multiple bins. Assume an order for 50 boxes. There is inventory for the SKU in two bins. Bin 1 contains 43 boxes and bin 2 contains 200 boxes. When the rule is set to “empty bins” 43 boxes are allocated from bin 1 and 7 boxes are allocated from bin 2 to satisfy the order. When the rule is set to “fewest picks” all 50 boxes are allocated from bin 2. “Empty bins” is almost always the best option for a distributor to use because it frees up bins and helps maintain high space utilization. For those companies where most order lines are for small quantities, choosing “fewest picks” would allow the occasional larger order to be picked from a single bin without the worry that the warehouse will be checker-boarded with bins containing small quantities. Unfortunately, a WMS does not usually allow this rule to be set by SKU, so a distributor has to pick the rule that is best on average.
9. Outside the preferred storage zone – the WMS would use inventory that is not in the primary putaway zone for the SKU first to clean up the warehouse; this capability is not common.



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10. Quality level – a customer or certain type of order might require product that is higher or lower in quality or meets certain industry standards (RoHS for example). The WMS could allocate inventory with the lowest quality grade that meets the customer's requirements. Another use for quality level is for inventory to be returned to a vendor. Only inventory with a specific quality status is eligible for return-to-vendor orders. This is not a common capability.

These rules can be in conflict with each other. To resolve these conflicts the rules are processed in a pre-defined sequence. The allocation process fails when it cannot find inventory to satisfy an order due to rule conflicts or a lack of inventory that meets critical criteria. The WMS may allow a person to manually allocate inventory to the order when it cannot find acceptable inventory or the WMS may force the order to be changed so inventory can be found that satisfies the order requirements. Changing the order is the most common approach.

Age rules, lot rules, country of origin rules, quality rules, and limitations specified on an order or contract are critical rules. For example, you cannot ship gaskets that must be recertified first (age rule) and you cannot ship a customer light bulbs made in Mexico if the customer specifically states no light bulbs from Mexico (COO rule). The remaining allocation rules exist to provide order to warehouse operations; you will note they specify preferences rather than yes/no.

The pick list can be printed or the order can be made available for wireless picking when inventory has been allocated for all lines on the order.

Contact: Bill Muehlbauer
Office (920) 922-7499
Cell (858) 204-4127