White Paper



Evaluating the Effectiveness of Existing Distribution Operations

Using Maps and Metrics to Focus Your Analysis

Background

Distribution Center (DC) Operations are continually under stress to reduce costs and improve throughput. DC operations have correctly received more visibility (and scrutiny) as a key part of an organization's supply chain. Whether this is a change in order profiles, smaller, more frequent orders, or due to a slippage in metrics or a budget variance, DC managers must be prepared to address this increased level of visibility and accountability. Progressive DC managers are rethinking and retooling their operations to excel at customer service requirements while identifying new opportunities to reduce their own operating costs. Their ultimate challenge, however, is to convert marketplace demands into competitive (and profitable) differentiators for their companies. But how?

Surprisingly, the solution for many DC managers may not be tethered to new analytical software tools, disruptive warehouse configurations or expensive automation systems. It often can be found by creating and studying the detailed documentation – the maps and metrics – of each process in each functional area within the DC operation.

First, a Positive Mindset

When evaluating the performance effectiveness of current DC processes and procedures, it is critical to maintain a positive atmosphere. It should neither be perceived nor deviate into a purely benchmarking exercise, a critique of operations or a "blamestorming" drill. Rather, the evaluation's objectives should be to:

- discover what is being done well;
- identify the key operational processes;
- recognize existing and potential competitive differentiators;
- and capitalize on existing resources and established good (if not best) practices.

Creating the Maps

The first question to ask during the evaluation process is: Do you really know what you are presently doing? If you have not fully documented your current operational processes, the answer is almost certain to be "No."

If they do not already exist, create process flow maps for each of the key operating areas within the DC. These maps should be detailed enough to be used as documentation for standard operating procedures. They can also serve as aids for the cross-training of existing staff and the orientation of new hires.

Create this documentation in the same sequence as material moves through the facility. Mapping the flow of materials will provide knowledge of upstream processes that could be relevant to, or have an impact on, downstream processes.

The key DC functional areas[1] which must be mapped from upstream through downstream include:

- Receiving and inbound staging
- Putaway
- Replenishment
- Warehouse order/shipment grouping
- Warehouse work release
- Picking
- Value-added services (e.g., kitting, ticketing, etc.)
- Packing
- Loading and manifesting
- Shipping and outbound staging
- Quality audit/quality control
- Inventory management (i.e., cycle counts and physical counts)

Perform a comprehensive step-by-step review of these various functional area process flows with the staff members who are responsible for performing the work. During the review process, solicit insightful and accurate feedback from the operations staff to identify any steps which can be eliminated or adjusted to improve overall effectiveness. The objective of mapping the process flow is to find out what is really happening during fulfillment activities within the DC and identify change opportunities. Among the immediate benefits will be the elimination of task redundancy.

For example, during an evaluation and mapping program, it was discovered that operators were manually entering order receipt information as a standard protocol. Mapping, however, revealed this data had already existed someplace else in the system; the manual entry was redundant, resulting in an inefficient repetition of work. The process flow map was streamlined by eliminating the manual entry.

[1] There may be other functional areas which are specific to a business, such as returns processing. Also, there may be steps that must be added or modified to support changes in customer or marketing initiatives.

During another evaluation, it was learned that small tasks done frequently and unnecessarily can have a large impact on efficiency. When workers were finished packing an order from a tote, the empty totes were accumulated at each packing station, consolidated onto pallets at a central processing point in the packing area, and then walked back to the picking area for reuse. The aggregate impact of this seemingly inconsequential procedure was significant in terms of lost time and productivity. The evaluation team's solution was to install a conveyor that ran past each packing station, allowing the packer to place the tote on the return conveyor when it was empty. The conveyor then transported the totes to the picking area. This minimized staff time away from their packing stations, thereby enabling them to work more effectively.

It is not unusual for several of these types of opportunities to be identified during process mapping, and the collective impact on productivity can be substantial.

When properly developed, DC process flow maps (Exhibits 1, 2 and 3) provide a definitive order and sequence that is well established. When system problems arise, they can be pinpointed and quickly addressed. Functional area maps allow you to see every stop, process or action as product moves through the facility and specifically address processes on the order fulfillment route. For example, receiving would begin with opening the trailer doors to check for damage before unloading. Step two is checking the purchase order against the packing list, etc.

DC Process Flow Maps

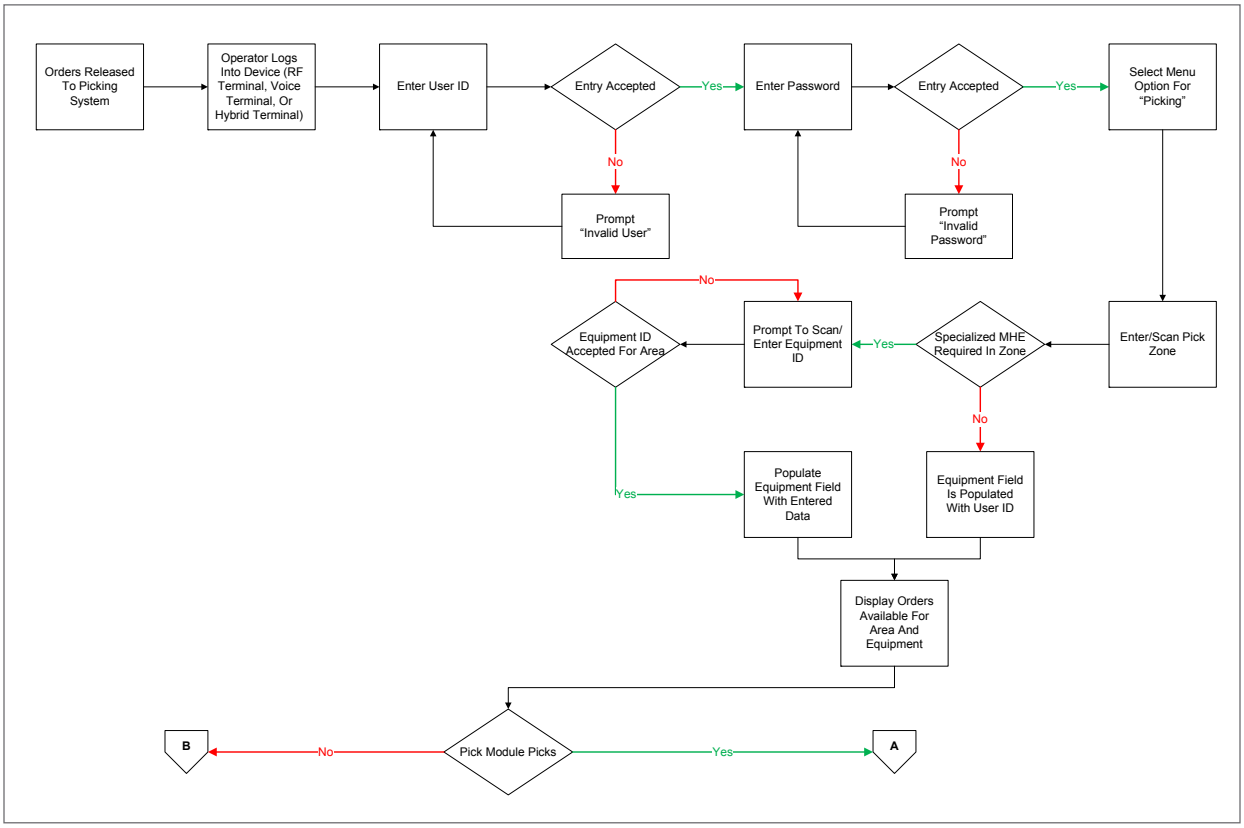


Exhibit 1: – Orders Released to Picking System Process Flow Map

DC Process Flow Maps – Continued

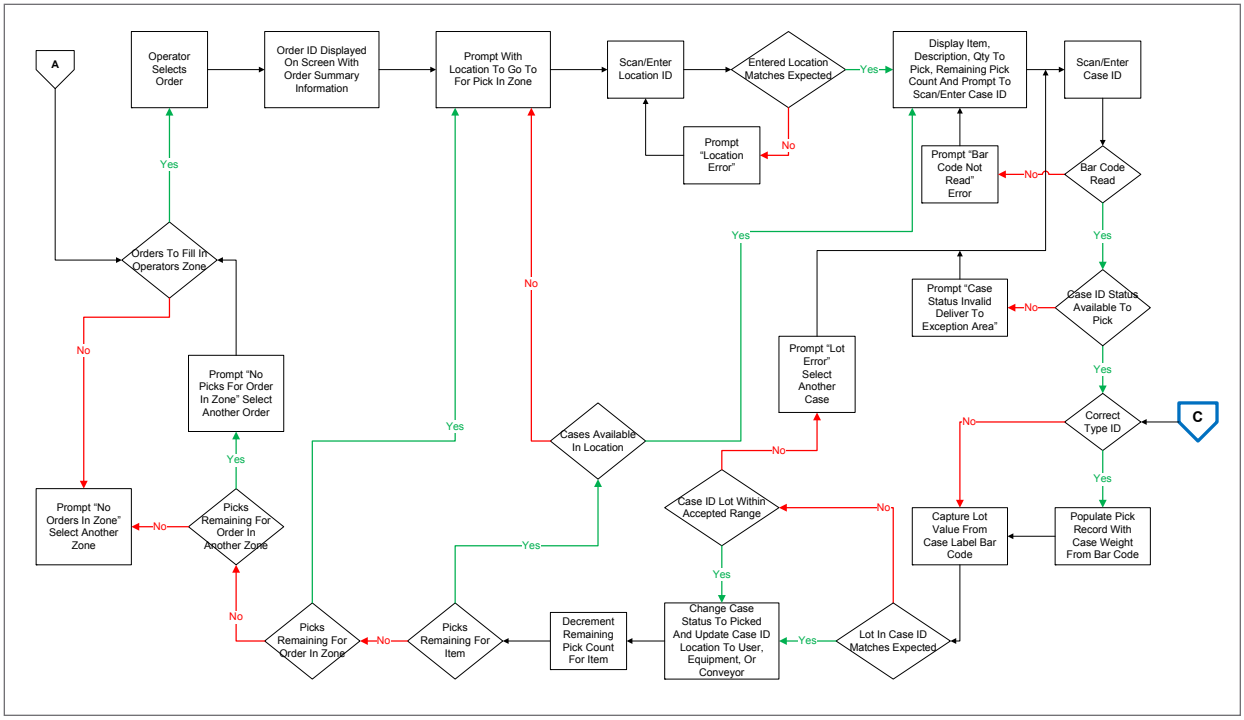


Exhibit 2 – Pick Module Picks, Process A, Process Flow Map

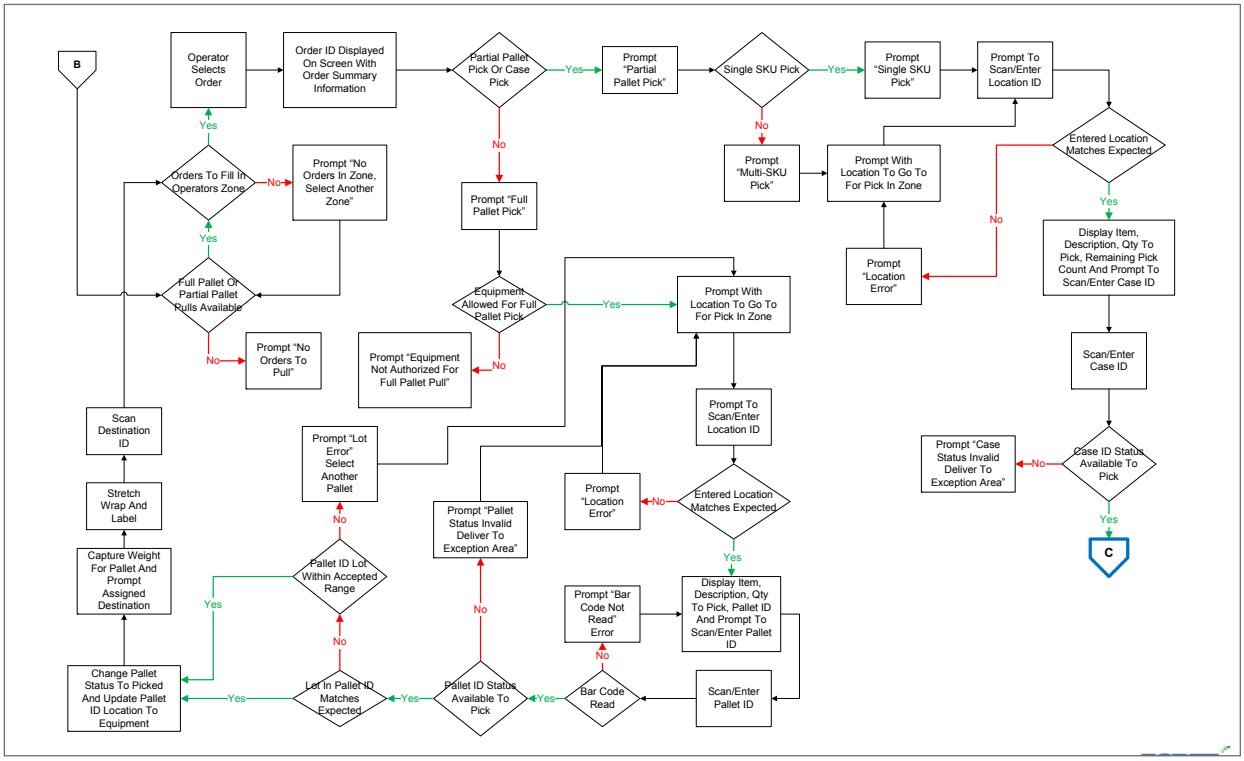


Exhibit 3 – Pick Module Pick, Process B, Process Flow Map

Flow maps are an excellent visual representation of the entire process. The best are designed so there is one input and one output. If you reach a decision point, there can also be one input with two decision points. An example of this would be the reception of goods, some of which require temperature-controlled storage. This then becomes a transition or decision point. Regardless, the map enables staff to see the complete flow of operations. They can reposition tasks in a different functional area and make confident yes-no decisions to prevent repetition. The result is a smoother, more efficient journey.

Creating the Metrics

Metrics and statistics should provide clear and useful insights in evaluating DC performance. Traditionally, DC activities and transactions have been measured on a global or macro perspective – a series of aggregate numbers serving as summary/reference points, primarily of value to executive-level management, but less useful to DC managers, supervisors and staff. (See Exhibit 4).

Exhibit 4

Traditional Metrics for Distribution Center Performance Evaluation

(Not intended to be an all-encompassing list)

- Inbound Purchase Orders
- Inbound Volume
  - By month, day and day of week
  - Pallets, cases and eaches by SKU
- Outbound Volume
  - By month, day and day of week
  - Orders (Note: There may be difference between a “system order” and a “warehouse order” or shipment. The warehouse order is the data entity to measure from an operations perspective. The system order is used to measure performance for customers [e.g., on-time delivery, completeness, correct quantities or correct items].)
  - Order lines by unit of measure (UOM), e.g., pallet, case each
  - Order line quantity for each UOM shipped

A detailed evaluation of DC performance can require some creativity. It is important to focus on measuring activities specific to the processes performed in each functional area. Verify that the measurements coincide with the process documentation for the area. And note that it is imperative to capture measurements at times of peak activity as well as during normal operational levels. The objectives are to determine what factors contribute to efficient operations and identify where choke points may exist. (See Exhibit 5.)

Exhibit 5

Sample Measurements for Specific Distribution Center Functional Areas

Receiving

- Inbound receipts and handling units processed (Note: Handling units could be pallets, cases, eaches or combinations of all three.)
- Handling units per receipt by receipt type
- By month, day, day of week and time of day
- By SKU

Putaway

- Handling units processed (pallets, cases, eaches, master packs, etc.)
- By month, day, day of week and time of day
- By SKU and UOM
- By storage or putaway area or zone
- By equipment type (if multiple types of equipment are used)

Replenishment

- Handling units processed (pallets, cases, eaches, master packs, etc.)
- Correlate to orders released by order type
- Correlate to order lines released
- By month, day, day of week and time of day
- By picking area, picking zone or picking area type

Fulfillment

- Handling units processed (pallets, cases, eaches, master packs, etc.)
- Correlate to orders released by order type
- Correlate to frequency of visits to a pick face (order line)
  - By line and handling unit type
  - Lines by operator correlated to pick zone
- By month, day, day of week and time of day
- By picking area, picking zone or picking area type
- Packing/Palletizing
- Handling units processed (pallets, cases, eaches, master packs, etc.)
- Correlate to orders released by order type
- By shipping carton type
  - Order lines per shipping carton
  - Break out special packing processes
- By month, day, day of week and time of day

Loading and Shipping

- Handling units processed (pallets, cases, eaches, master packs, etc.)
- Correlate to orders released by order type
- By shipment preparation type
  - Loading time
- By order type
- By carrier and service level
  - By month, day, day of week and time of day

The point is this: When measuring DC performance, the manager must develop a specific set of metrics for each step in each functional area to accurately assess DC effectiveness. For instance, knowing and reporting how many order lines are processed in the DC may be a meaningful aggregate measurement to executive management. But if you are appraising picking activities within the picking zones, this statistic will not be helpful. In one picking zone you may be able to regularly process 20,000 lines a day, but in another you may only be able to process 10,000 per day. Without different performance metrics in each area, you would be unaware of this and unable to accurately assess performance efficiency or identify and address problems.

Review Special Requirements and Processes

Customer requests for master packs, kitting, ticketing, POP display assembly, etc. are often viewed as burdensome or even onerous by DC staff. But in reality, they are opportunities to differentiate your services from those of your competitors, building both a competitive advantage and customer loyalty. Yet, like routine services, these special requirements and processes should be documented with flow maps and appropriate metrics to capture the associated tasks and costs.

These are some questions to consider when evaluating special processes and offerings within your DC:

- Are these being done as a standard process to differentiate your service from the competition?
- Are these being performed to meet specific customer requirements?
- Are they being done as a verification process because of an unsatisfactory upstream process which needs correction?
- Are they necessary to meet a special marketing program?
- Have the processes become routine, and are they still required?
- Can they be improved or enhanced?

Regardless of motivation, providing special requirements willingly and seamlessly will give your customers a positive perception of your DC operation and keep them coming back. DC operators have determined that distribution, including specialized services, will build brand loyalty with their customers and help them grow. It's a sound strategy for your DC as well.

Let's look at several special processes that customers have required to address an operational issue, to make their material handling easier on their end or build brand loyalty through value-added services.

- A customer insists on 100 percent inspection after receiving complaints about missing items from their orders. This is not a DC SOP for every outbound shipment. The question should be asked: Why are there picking inaccuracies? Solutions can then be proposed, tested and instituted. The DC staff learns the new process and it becomes SOP. Assuming it is the most productive solution, can it be offered to other DC customers as a special process? Or is there another, more streamlined answer in the form of scanners, with DC staff handling only exception orders with errors or other issues?
- A customer wants multiple labels in multiple locations on each pallet shipped to his receiving facilities. From the viewpoint of the DC staff, it is tedious, extra work that is slowing down the operation. Nevertheless, the service is provided, and the customer sees this "ease of doing business" as another reason to remain loyal.
- A retailer offers standard "white glove" gift wrapping for their high-end fashion products. Their objective is to build their brand through the excitement of receiving an elegant gift. Packaging is a crucial part of this strategy. To meet these requirements, the DC operation must include careful attention to detail and a significant number of atypical process steps. Through the use of maps and metrics, the DC is able to standardize and streamline the requirement to everyone's satisfaction.

Case Study: Re-engineering Returns

Processing returns is costly. But it can be re-engineered to:

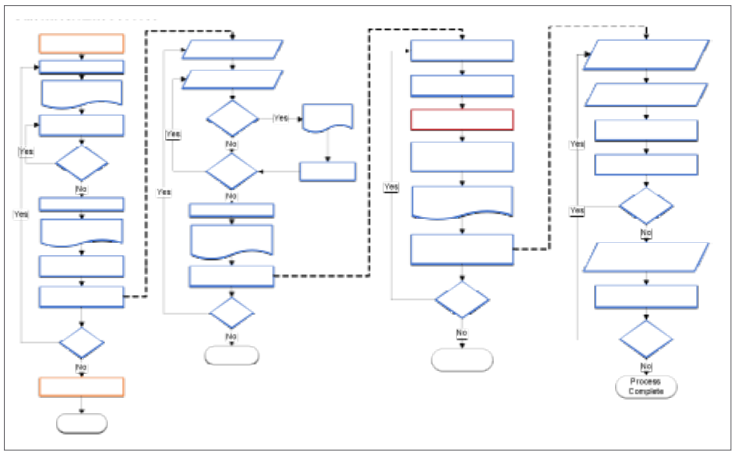
- Improve productivity/throughput (increase capacity)
- Reduce labor requirements (save money)
- Reduce footprint within the facility (save space)

The following case history illustrates the point.

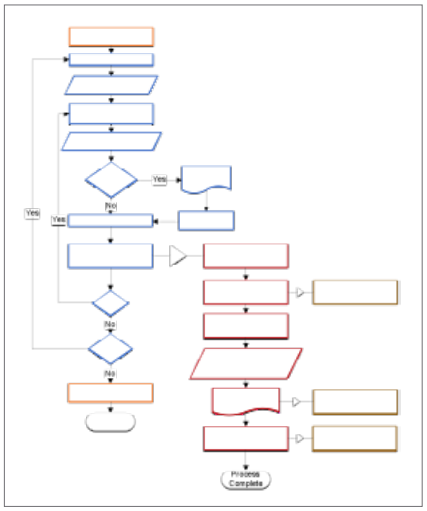
The current returns processing area occupies approximately 10,400 sq. ft and is in close proximity to other DC functional areas. A portion of the process is currently divided into six separate steps, each performed by a different DC employee. The returned product is transferred from one step to the next as the returns are processed in order to return them to stock. By re-designing the process so that more tasks were performed by a single employee, significant improvements and savings were realized. In order to achieve this, the order of the process steps was changed and new workstations and automated equipment employed.

Current vs. Re-Engineered Returns Process

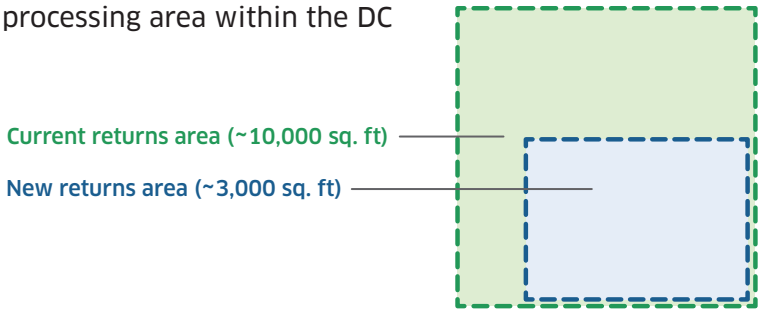
Current returns process flow diagram: 27 process/data events



Re-engineered process flow diagram: 17 process/data events



Relative footprint of the returns processing area within the DC



Projected labor savings by implementing the Re-engineered Returns process design:

Labor Spend Estimate Results	E.P.s	Labor
Current Daily Labor	44.4	$4,100
Current Annual Spend		$984,000
To-Be Daily Labor Est.	27.6	$2,500
To-Be Annual Spend Est.		$600,000
Daily Difference	16.8	$1,600
Total Est. Annual Savings		**$384,000**

High-level Investment Estimate

Investment estimate for the Re-engineering Returns Area: $500,000

- Result of the process development is an estimated labor savings of more than $380,000 per year.
  - Based on estimated labor savings alone, the projected payback period is 1.3 years.
- Bracket estimate includes costs to purchase and install new equipment, engineering, project management and travel expenses.

Assemble the Information

Maps and metrics are simple yet powerful tools in evaluating the effectiveness of current DC operations. Summarize and interpret the observations for each step within each functional area based on the specifically devised metrics. This will provide visibility to the flow of materials through the facility and the interaction (good and bad) among the different areas of your DC.

Reviewing the process flow maps and metrics will present opportunities to enhance operations and address areas that are causing operational friction. The process will offer DC associates the ability to contribute to operations and in effect, take ownership of their areas. The outcome of the evaluation will confirm that processes are working well and pinpoint those that need improvement. At a minimum, it will identify repetitive processes and routine tasks that can be systemized, thereby allowing staff to more effectively address exception conditions.

Why FORTE

Single-Source Accountability

Whether we're helping you develop a strategic plan, design and build a distribution facility, or optimize a distribution operation through performance metrics and analytics, FORTE provides a true single point of contact responsible for the complete performance of your distribution network. No finger pointing. No fragmentation of responsibility. No multiple suppliers for technical support. You have performance goals, and it's our job to make sure they're met on an ongoing basis.

Total Objectivity

We don't manufacture equipment. We don't develop WMS software. We don't have commercial arrangements with any suppliers for expected volumes of business. We're simply interested in delivering the most efficient distribution solutions at the lowest total cost. Our client-side service approach means our only allegiance is to our customers. So with every engagement, you know we'll choose the most appropriate level and blend of technologies integrated into an effective operational system.

Expertise

Our team is deeply rooted in the hands-on implementation of distribution center design and warehouse automation. FORTE's engineers and technicians integrate today's best practices in supply chain management and distribution center operations while developing next-generation technologies. As a result, our solutions employ the best combination of practical advice, data-driven analysis and technology-enabled systems. With FORTE, you get:

- More accountability than a consultant
- More experience than a systems integrator
- More objectivity than a manufacturer

That's why the world's fastest-growing companies are making distribution their FORTE.

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