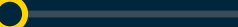# Softeon

the

SMART automated
warehouse of the future.

Next Generation Warehouse Software Addresses the
Needs of Today's Dynamic Distribution Environment

THE COMING ERA OF
THE SMART, AUTOMATED WAREHOUSE

The term "smart" applied to various products usually has to do with internet connectivity. So, for example, a piece of field equipment can send data on its condition and performance, allowing the manufacturer to monitor maintenance needs and perhaps offer suggestions for how equipment users can improve performance.

The smart warehouse can indeed leverage the internet – but also involves a lot more than just internet connectivity, as we will describe below.

Another key current dynamic is the severe labor shortage and rising labor costs in most markets. With Amazon previously pushing wages to $20.00 per hour, retailer Target announced a new starting wage of $24.00 for DC workers in some markets in March 2022. That upward move in labor costs comes as many companies are already struggling with rising distribution costs, especially for ecommerce fulfillment.

Finally, shortened fulfillment cycle times for picking, packing and shipping orders is causing many shippers to struggle to keep up with these new customer-driven requirements.

As a result of these three trends - labor shortages, rising costs and shrinking cycle times – companies are looking as never before at optimizing and automating distribution processes. They are also able to choose from an incredibly large array of automation technologies, from traditional sortation systems to new goods-to-person technologies to an expanding number of options in mobile robots and more.
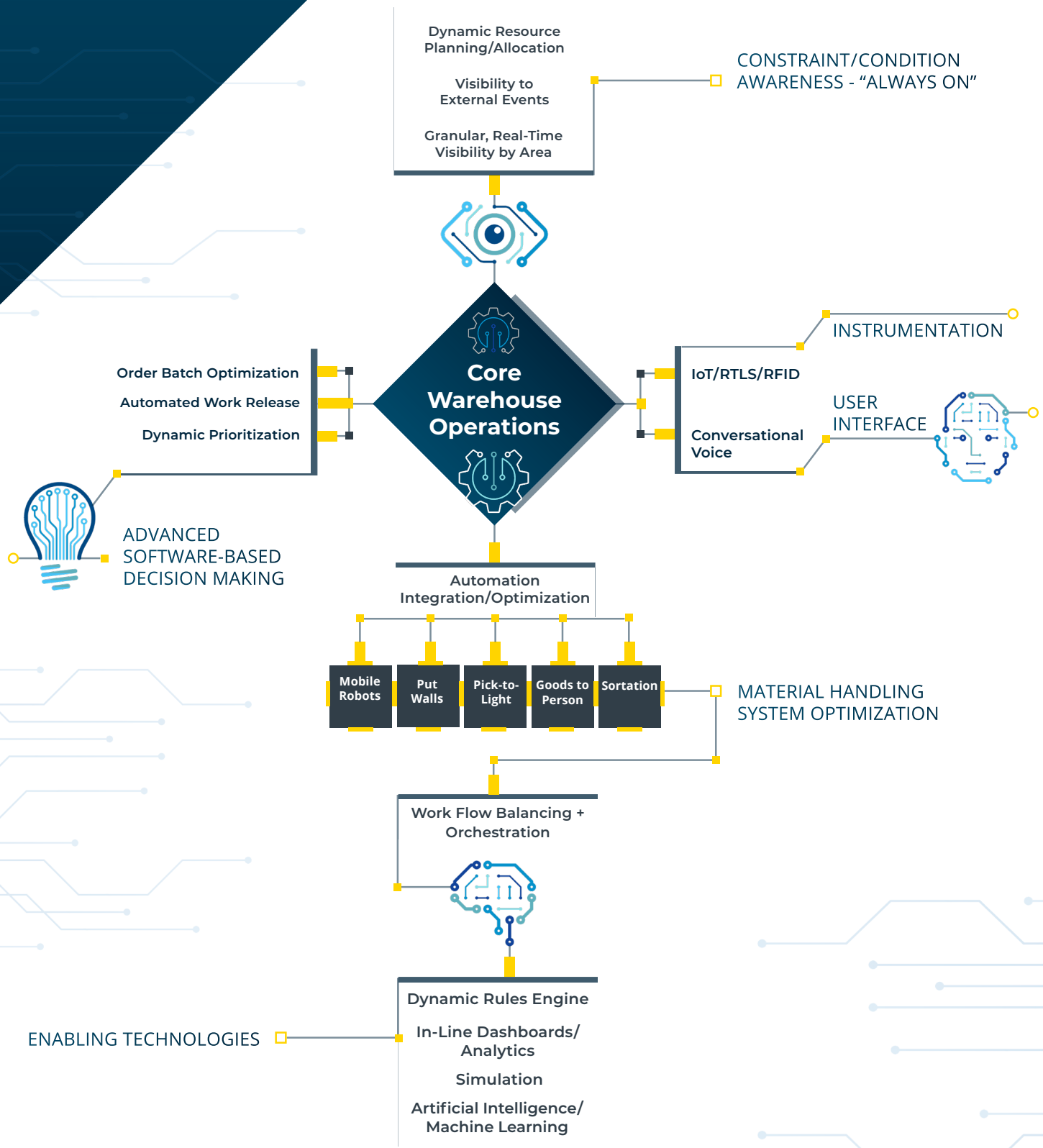
While automation may not be for everyone, the percentage of companies deploying, or at least planning for automation is at a very high level – almost universal for larger and/or complex DCs. The question is what combination of technologies to consider – and then how to easily implement these systems and optimize performance and throughput.

Need for a New Generation of Warehouse Software

Traditional Warehouse Management Systems (WMS) have driven high levels of efficiency for thousands of companies. But arguably, there has been only incremental WMS progress over the last 20 years, while companies have increasingly needed an enhanced set of tools to meet new throughput expectations and push back against rising costs - all while enabling shortened cycle times.

Softeon believes - and has demonstrated - that there is a new paradigm in warehouse operations and technology. It involves systems that are smarter - based on new levels of visibility and awareness, advanced optimization technologies, and increased system-based decision-making. It leverages a number of supporting technologies, from IoT to simulation and machine learning.

The **SMART** Automated Warehouse

Dynamic Resource Planning/Allocation

Visibility to External Events

Granular, Real-Time Visibility by Area

CONSTRAINT/CONDITION AWARENESS - "ALWAYS ON"

Core Warehouse Operations

Order Batch Optimization

Automated Work Release

Dynamic Prioritization

ADVANCED SOFTWARE-BASED DECISION MAKING

INSTRUMENTATION

IoT/RTLS/RFID

USER INTERFACE

Conversational Voice

Automation Integration/Optimization

Mobile Robots	Put Walls	Pick-to-Light	Goods to Person	Sortation

MATERIAL HANDLING SYSTEM OPTIMIZATION

Work Flow Balancing + Orchestration

ENABLING TECHNOLOGIES

Dynamic Rules Engine

In-Line Dashboards/ Analytics

Simulation

Artificial Intelligence/ Machine Learning

The smart automated warehouse of the future is built on a number of capabilities and components that can be flexibly deployed and combined to meet specific requirements. These capabilities are delivered by a foundation of Warehouse Management Systems, but importantly adding a whole new generation of capabilities through newer and complementary Warehouse Execution System (WES) technology.

Below, we describe the key capability groupings and enabling technologies of the smart warehouse:

CORE WAREHOUSE OPERATIONS

The smart warehouse is built on top of core operations excellence, as in part delivered from an advanced Warehouse Management System. That includes pervasive use of mobile terminals and bar code scanning, system-directed activity, advanced task management, support for multiple picking and replenishment strategies, dynamic slotting, detailed labor reporting and more.

CONSTRAINT/CONDITION AWARENESS

Perhaps the defining attribute of a WES is that it is "always on" – aware in real-time of activity and constraints that can impact decision-making. The smart warehouse is always listening to the environment in a way that is fundamentally different than how a WMS sees the world, which is more reactive in nature, processing the work as it sequentially arrives physically or logically at each step in the process.

That awareness includes granular real-time visibility to throughput and bottlenecks at user-definable levels, whether that is in the case picking area as a whole or at each level of a multi-level case pick module, for example.

The smart warehouse knows what is expected in terms of throughput in each area, and will send alerts if throughput falls below determined expectations.

But there is a lot more here: that real-time visibility can be turned into powerful dashboards that give managers and supervisors a detailed look at where things stand across the DC.

But here's the cool part: The WES uses the same data being used to power the dashboards to make decisions about the flow of goods and work. For example, if a put wall is becoming congested, the smart warehouse will either slow down upstream pick activity, or send picks to an alternative path for a period of time, such as a manual cart pick, until the congestion dissipates. And it does this "on its own."

**Now that's very smart.**

ALWAYS ON

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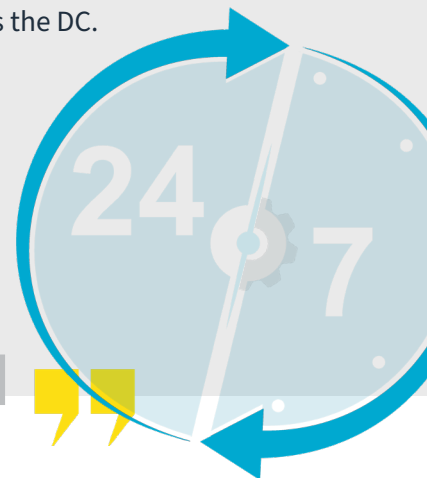
The smart warehouse awareness extends to external events as well. If a truck is going to be late, will that impact planned inbound resource requirements or order fulfillment based on allocating that inbound inventory?

The granular visibility of activity – current and planned – then provides the foundation for intelligent planning of labor and resources, with dynamic allocation, based in part by the use of simulation technology, as discussed later in this document.

Here is the reality – even with advanced Warehouse Management Systems, such as offered by Softeon, operations are highly dependent on human decision-making on what work to release and when, at what time to change order and replenishment priorities, and more.
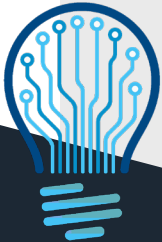
At the **center of the smart warehouse** of the future is the ability of the WES to **automatically** release orders and other work **autonomously, without the need for human intervention.**

This automated release of work is based on a variety of attributes, including order priority, inventory and resource availability, optimization opportunities, carrier cut-off times and more.

This capability supports the concept of "waveless picking," in which pick tasks are dynamically delivered to associates based on these types of configurable parameters. **Here are some examples:**

One early Softeon WES customer was leery of letting the system automatically release the work, preferring to see the recommendations first and then manually deciding to approve them or not.

But through an odd combination of events, the company was short-staffed, and didn't have the supervisors needed to use the more manual approach at go-live. So the company relied on the smarts of the Softeon solution to manage the release of work automatically - and it worked perfectly.

The automated release of work also involves dynamic prioritization of tasks as conditions in the DC change. WMS solutions have certainly provided foundational prioritization capabilities for many years, but new smart warehouse capabilities take it to new levels.

Consider basic cart picking, for example. In the Softeon smart warehouse, when a picker scans the cart ID, the system dynamically assigns picks to that cart, based on the cart configuration and the goal of minimizing total travel time.

But what if a very hot order comes in?

The Softeon smart warehouse will scan the environment to see if any cart pickers have orders assigned to their carts that could be replaced with the new "hot" priority order.

But it does this in a smart way, by only assigning the new order if the pick locations are in front of the picker, so they do not have to reverse direction after having already completed picks in an area.

INSTRUMENTATION

The smart warehouse will increasingly use technologies such as RFID, Internet of Things (IoT), and real-time location systems (RTLS) to track inventory, equipment and people in a more automated way, empowering new types of capabilities.

RFID, starting to gain real traction in retail to support the highly accurate inventory levels needed for store fulfillment, can eliminate many bar code scanning activities, and automatically identify and prevent errors, such as miss-picks. The smart warehouse will well-support RFID as an alternative to bar code scanning.

Iot can be implemented in many ways. For example, by tracing a lift truck driver's actual movements, analytics can identify if workers are taking the most efficient travel paths to complete their work. IoT can be leveraged in the smart warehouse in many other ways, such as enforcing social distancing to identifying "dwell times" when product isn't flowing as well as it should.

VOICE

The smart warehouse increasingly leverages Voice technology to not only improve picking and other distribution processes, but in the way workers - especially managers and supervisors - interact with the warehouse software.

Gartner calls this "conversational Voice," in contrast to the "transactional Voice" that has been in place for decades for order picking and other tasks.

Softeon customers currently use Voice to request information from the WMS. An example is calling for an updated status on the current wave progress on a mobile device, or requesting the replenishment status of an empty location that is awaiting a pick.

MATERIAL HANDLING SYSTEM OPTIMIZATION

Regardless of the type of automation, whether it's goods to person, put walls, mobile robots or any other technology, the smart warehouse will seamlessly integrate with - and optimize the performance of - these systems, both individually and as a whole.
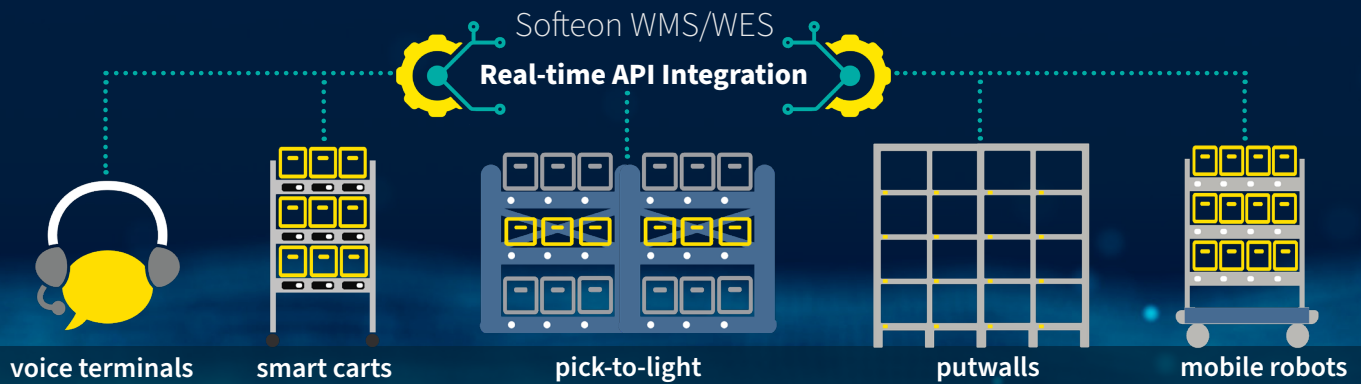
Softeon can directly integrate with systems such as Voice, smart carts, pick-to-light, put walls and mobile robots without the need for any third-party software. This has many advantages, including lowering total costs and the ability to optimize the performance of these systems within the full context of WMS/WES information - eliminating the process and information siloes that occur when the WMS "throws the orders over the wall" to these picking sub-systems.

The smart warehouse from Softeon includes an integration layer that can be thought of as an operating system for managing integration and performance of any number of automation technologies.

This "plug-and-play" capability not only eases initial integration efforts, but allows the automation systems to be included in the larger orchestration of workflows, considering both automated and non-automated processing areas, as a holistic ecosystem, optimizing the flow of work and total throughput.

This is very different than how warehouse software has worked in the past within the scope of automation.

Direct Management and Optimization of Picking Sub-Systems

Softeon WMS/WES

Real-time API Integration

| voice terminals | smart carts | pick-to-light | putwalls | mobile robots |

The smart warehouse uses as a foundation of several enabling technologies. Those include:

ENABLING TECHNOLOGIES

DYNAMIC RULES ENGINE

Used to define and dynamically execute rules relative to process and flow conditionally, meaning it will consider capacities and constraints.

IN-LINE ANALYTICS

The smart warehouse will be instrumented with a rich array of dashboards and analytics, increasing "in-line" to support real-time decision-making.

SIMULATION

The smart warehouse leverages simulation tools to improve resource planning, "what if" scenario analysis, system testing, and more. For example, Softeon will forecast expected order volumes and profiles based on history and other factors, then simulate how the default labor and resource plan matches-up. The result is a dynamic, time-phased plan that identifies where workers and other resources will be needed and in what quantities for every hour of a shift.

One Softeon customer also used our simulation capabilities to virtually test whether compliance requirements (labeling, EDI, etc.) for dozens of retail customers would be met without the need to physically test those capabilities live on the DC floor.

ARTIFICIAL **INTELLIGENCE**/MACHINE **LEARNING**

Naturally, artificial intelligence and machine learning will play a growing role in the smart warehouse moving forward.

One example: The automated release of work based on estimates of processing, carrier schedules, and more will be continually improved based on machine learning estimates versus actuals, including process times and throughput levels, not just in terms of general expectations but what is being achieved on a particular day, or even right now in the moment.

THE SMART WAREHOUSE WILL DELIVER A WIDE ARRAY OF BENEFITS TO SHIPPERS. THOSE INCLUDE:

- Significantly reduced labor costs
- Higher and more consistent DC throughput
- Reduced need for automation (e.g., number of diverts) or realize more throughput from a fixed level of automation
- Improved labor planning and allocation across a shift
- Improved decision-making through automation
- Faster implementation of new automation technologies, especially picking sub-systems
- Greater agility to add change processes or add automation over time

The smart warehouse is a **step-change improvement** in warehouse software and facility performance that **will deliver advantages** to companies that embrace **their vision before their competitors.**

THE SMART, AUTOMATED WAREHOUSE OF THE FUTURE – HERE TODAY FROM SOFTEON.

The smart, automated warehouse isn't just some academic vision.

The smart warehouse paradigm should be thought of as a journey - not a destination. This is true both in terms of the overall market and individual distribution centers. All of the capabilities we have described in this piece are available today - some more complete, while others are less mature.

THOSE CAPABILITIES INCLUDE:

- Granular real-time visibility and awareness
- Advanced labor planning and dynamic resource allocation, using simulation
- "Always-On" operating mode
- Order batch optimization and orchestration
- Automated release of work - the "Autonomous WMS"
- Next-generation dashboards
- Plug-and-play integration with material handling and picking sub-systems
- Dynamic (condition aware) rules engine
- Conversational Voice

But there is a lot more to come, especially the **enhanced use of AI** and **machine learning**.

The **smart automated** warehouse is where the distribution market is headed – **but it's available from Softeon today.**

About Softeon

Softeon is a global provider of supply chain solutions from planning through execution, anchored by our Warehouse Management System (WMS), Warehouse Execution and Distributed Order Management (DOM) solutions. Our advanced SOA-platform is engineered to reduce complex problems into simple solutions for a faster time to market and lower cost of ownership. Users can implement solutions incrementally to solve a specific challenge or deploy an integrated system.

Configurable modules and rules-based solutions give market leaders the business agility they need to get ahead and stay ahead. Companies choose the flexibility and ease-of-use of the Softeon platform to drive higher business value and accelerate ROI.

Deployment options include Cloud or on-premise deployment – delivered with a 100% track record of system success.

the SMART **automated** warehouse of the future - **delivered today.**