Last call: Wyoming Liquor rolls out voice

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Survey Webcast: Is investment gaining momentum?
Thurs., May 15 at 2 p.m. ET
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Andersen receives Jock Menzies IWLA Distinguished Service Award

THE INTERNATIONAL Warehouse Logistics Association (IWLA) recently awarded the first-ever Jock Menzies IWLA Distinguished Service & Leadership Award to former IWLA president and CEO Joel Anderson.

The 2014 IWLA Jock Menzies Distinguished Service Award is one of the warehousing industry’s highest honors. It recognizes outstanding leadership and service to the warehouse-based third-party logistics industry and to IWLA.

“In seven years of service to IWLA, Joel Anderson dedicated himself to making IWLA a powerful force in Washington and a leader in providing education and resources to the warehouse logistics industry,” said IWLA chairman of the board Tom Herche, president of United Warehouses.

The award, first bestowed in 1996, was dedicated in 2014 to T. “Jock” Menzies III, co-founder and former president of the American Logistics Aid Network (ALAN), who passed away in 2013. Menzies turned his 40 years of logistical knowledge into a humanitarian effort after witnessing the aftermath of Hurricane Katrina in 2005.

AIM Global launches RAIN RFID Alliance to promote RFID

GOOGLE, IMPINJ, INTEL and Smartrac, along with leading AIDC industry association AIM Global, have formed RAIN RFID, an industry alliance dedicated to promoting the international adoption of UHF RFID.

RAIN will promote awareness, education, programs and initiatives to accelerate the growth and adoption of ISO–IEC 18000-63 / EPC Gen2 RFID in business and consumer applications worldwide. “UHF RFID is the technology that will link information about items in our everyday world to the Internet,” said Shahrokh Shahidzadeh, senior principal technologist at Intel. “The RAIN Alliance will foster the growth and adoption of UHF RFID to improve business efficiency and, ultimately, people’s lives.”

“Establishing an industry alliance focused solely on UHF RFID is the next step in the evolution of the technology,” said Chris Diorio, chief strategy and technology officer at Impinj, the architect of the UHF Gen2 protocol.

Hannover Messe 2014 draws 180,000 worldwide visitors

“A Hannover Messe is the only trade fair in the world that covers the entire spectrum, from individual components to fully functional, smart production lines,” said Jochen Köckler, member of the managing board at Deutsche Messe. Featuring more than 5,000 exhibitors, the event attracted more than 180,000 visitors from more than 100 different nations. More than one in every four visitors came from abroad, mainly from the European Union (57%) as well as from South, East and Central Asia (20%).

Staged under the keynote theme of “Integrated Industry—NEXT STEPS,” the trade fair focused on intelligent, self-organizing factories and the transformation of energy systems. The next Hannover Messe is scheduled to be held from April 13-17, 2015.

Optimism among U.S. industrial manufacturers rises to highest level in eight years

THE POSITIVE SENTIMENT about the prospects of U.S. commerce in the next 12 months reached the highest level since the fourth quarter of 2005, according to the Q1 2014 Manufacturing Barometer, released by PwC US.

Optimism around the prospects of the U.S. economy during the next 12 months rose among U.S. industrial manufacturers to 71% in the first quarter of 2014, from 68% in the previous quarter and 55% in the first quarter of 2013.

“Management teams continue to indicate consistent near-term spending plans, including hiring more workers, supporting new product development and investing in IT and R&D,” said Bobby Bono, PwC’s U.S. industrial manufacturing leader. And, 82% of respondents expect positive revenue growth for their own companies in the next 12 months, 15% forecast double-digit gains and 5% anticipate decreased revenues. The projected average revenue growth rate over the next 12 months is at 5.3%, well above the 4.3% recorded in the first quarter of 2013.
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Ready to gain an edge?

Are you looking for areas in your operations where software and technology can help you gain an edge? Well, the goal of our Annual Technology and Innovation Issue is to stop you in your tracks and give that question closer consideration.

If the vibe we felt at Modex 2014 is any indication, many readers are not only contemplating technological adoption, but also looking for ways to fully optimize past investments—and suppliers are ready to respond.

In fact, our editorial team found that some of the biggest and best-known producers of automated materials handling equipment were spending more time discussing the software that supports their systems than the actual equipment that filled their allotted booth space.

As St. Onge’s Bryan Jensen shared with us in our recent Conveyor Webcast (mmh.com/2014software), a few issues are driving this renewed focus. The first is that the market has reached a plateau in terms of speed in which the equipment operates. Now, says Jensen, operations are looking to optimize the systems through software innovation to work smarter, not necessarily faster.

Second, Jensen says the software supporting automated systems has recently lagged behind operational achievements. “They’re now playing a game of catch up,” says Jensen, “and they’re going to need to keep pace, especially as order fulfillment requirements become increasingly more complex.”

And while you may be working closer with your automation supplier on software innovation, the collection of stories that fill this issue should be proof enough that a broader technological transformation is under way.

On page 26, associate editor Josh Bond digs into the findings of our 2014 Software Usage Survey, our annual look at adoption rates and future investment plans. According to Bond, adoption and investment continue to increase at a deliberate, yet healthy pace, with projected “average planned spend” over the next year jumping up nearly $100,000 over 2013 data.

“We found the well-documented challenges facing operations continue to have a positive effect on software investment,” says Bond. “And, software’s transition from monolithic to adaptable has made it more approachable, which is evident in readers’ spending plans and strategic focal points.”

Bond and software guru John Hill will dive into all the details in our 2014 Software Usage Survey Webcast on May 15 (mmh.com/2014software).

Speaking of adaptability, on page 32, editor at large Roberto Michel offers the definitive state of cloud solutions for the warehouse. While analyst firm ARC Advisory Group reports the cloud share of the WMS market is less than 10%, Michel says that number will surely change. “Cloud WMS has some hurdles to get over,” he says, “but once more operations realize its scalability, growth will be quick.”

On page 38, Bond looks at the state of robotics in materials handling and then on page 46 brings us up to date on RFID’s long and divided road to the party. “RFID’s success has centered on targeted, incremental improvements,” says Bond. “But don’t forget, the market is seeing double-digit growth that parallels the early days of bar code.”

We hope this collection of articles does, in fact, stop you in your tracks. And, if you’ve found a way to squeeze more productivity out of your operations by applying software and technology, be sure to let us know.
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Zebra Technologies to acquire Enterprise business from Motorola Solutions

ZEbra begins work to integrate a company 2.5 times its size for $3.45 billion.

By Josh Bond, Associate Editor

Zebra Technologies and Motorola Solutions have entered into a definitive agreement in which Zebra will acquire Motorola’s Enterprise business for $3.45 billion in an all-cash transaction.

In a blog exploring the acquisition, Modern’s executive editor Bob Trebilcock outlined the united strengths of the new entity. “The combined companies have an end-to-end solution for just about any customer’s data collection and mobile computing needs,” Trebilcock wrote. “In the warehouse and distribution space that is important to Modern readers; Zebra is the market-leading provider of bar code printers and has strength in passive and active RFID solutions. Meanwhile, Motorola Solutions has been the market leader in mobile computing and bar code scanning, with strength in RFID readers, headsets for voice recognition solutions and wireless LAN. Together they have a complete portfolio to match the one put together in recent years by Honeywell, especially given its recent purchase of Intermec/Vocollect.”

“Zebra gains instant access to several new data capture technology markets,” said Richa Gupta, a senior analyst with VDC Research. “At the same time, they have to integrate 4,500 new employees plus technology that historically hasn’t been their core business. Mobile computing and bar code scanning have fast product cycles, and they will have to learn to keep up.”

The good news, Gupta added, is that Zebra and Motorola were never competitors. Rather, they have a long history of working together as partners. “This is not market share consolidation in any way,” she said.

Zebra acknowledges the potential pot holes. “Any integration of this
size has challenges,” says Phil Gerskovich, Zebra’s senior vice president of new growth platforms.

In terms of marketing, Gerskovich said the Motorola name will eventually go away, but Zebra has not determined how Motorola’s products will be branded going forward.

Both companies believe the acquisition better positions them to take advantage of two trends: the increasingly mobile worker and the Internet of Things. According to Gerskovich, the deal was the result of a competitive process put in motion by Motorola last year. “We were pleased we were able to walk away with these assets,” he said. “In different economic times, we wouldn’t have been able to do this deal, but with low interest rates, it made sense.”

“This acquisition will transform Zebra into a leading provider of solutions that deliver greater intelligence and insights into our customers’ enterprises and extended value chains,” said Anders Gustafsson, Zebra’s chief executive officer. “It positions Zebra as a leading technology innovator, with the accelerating convergence of mobility, data analytics and cloud computing.”

“Our Enterprise business is an ideal fit for Zebra,” said Greg Brown, Motorola Solutions chairman and CEO. “This transaction will enable us to further sharpen our strategic focus on providing mission-critical solutions for our government and public safety customers.”

Motorola’s Enterprise business reported 2013 pro-forma sales of approximately $2.5 billion (excluding sales of its iDEN products). Through this transaction, Zebra plans to strengthen its position in key industries including retail, transportation and logistics, and manufacturing and serve approximately 95% of the Fortune 500.

Zebra Technologies, with 2013 sales of $1 billion, is an industry leader in bar code and enterprise printing, asset tracking, Internet of Things (IoT) solutions, and motion and location sensing. The combined Zebra/Motorola’s Enterprise business would have had pro-forma sales in 2013 of approximately $3.5 billion. Approximately 4,500 employees are expected to join Zebra’s 2,000 upon completing the transaction.

The transaction will significantly expand Zebra’s geographic reach. The combined company will have about 20,000 channel partners in more than 100 countries, and will hold a portfolio of intellectual property with approximately 4,500 U.S. and international patents issued and pending.

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Consumer goods suppliers identify $3 million in potential annual savings with improved DSD processes

A NEW REPORT from Honeywell has found that millions of dollars can be saved by evaluating and improving direct store delivery (DSD) operations—namely the way that products are ordered, sold, delivered and merchandised.

“In looking for confirmation about whether DSD as a model continues to be important, the message came through strongly,” said Brian Schulte, industry director for direct store delivery for Honeywell, in a recent interview. “Many customers see the value in staying close to the consumer from a competitive standpoint.”

The report contains feedback from 350 C-level consumer goods executives and directors from across the globe. Results indicate that 49% of organizations feel increased transportation costs have severely impacted profit margins in the past 12 months. But those organizations that have carried out process evaluations in the past year to improve their DSD processes have cut, or expect to cut, costs on average by $734,000 annually.

Additionally, approximately 20% of all respondents have experienced, or expect to experience, at least $1 million a year in tangible cost-savings through DSD process re-engineering, and about 20% of companies with 3,000 or more employees anticipate saving at least $3 million.

“SKU proliferation is one of the areas where we see the most pressure in warehousing and distribution,” Schulte said. “Customers realized they were carrying a lot of SKUs not knowing which might be hot and take

Report says millions of dollars can be saved by evaluating and improving direct store delivery operations.
off, but wanting to be ready just in case. This strategy ended up creating losses instead of gains."

Through making improvements to delivery, truck loading, delivery receiving/check-in, merchandising and order processes, respondents indicate that approximately 30 minutes could be saved in each of those five areas per route, per day, equating to more than 2.5 hours per day for each DSD route.

Nearly 60% of surveyed organizations view DSD as key to their company’s business strategy going forward.

The top five areas identified by survey respondents for cost improvement are fuel costs, merchandising, delivery receiving/check-in, delivery and payment procedures.

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**MAPi BUSINESS OUTLOOK**

**Manufacturing finds its footing**

Despite some concerns with current business conditions, near-term prospects for the manufacturing sector look bright, according to the quarterly Manufacturers Alliance for Productivity and Innovation (MAPI) MAPI Business Outlook.

The survey’s composite index, a leading indicator for the manufacturing sector, improved to 69 in March 2014 from 67 in the December 2013 survey. It marks the fifth-straight quarterly advance and the highest level since the March 2011 reading of 72. For 18 quarters, the index has remained above the threshold of 50, the dividing line separating contraction and expansion.

In a recent interview, Donald Norman, MAPI senior economist and survey coordinator, said he has watched the index slowly increase in recent months and years. “For the first few months of 2012 and 2013, the manufacturing sector was fast out of the gate, then things softened toward the end of each year,” Norman said. “For 2014 I don’t have any reason to believe this is a pattern that will necessarily repeat itself. I have problems with the notion of cycles,” Norman explained. “There’s nothing automatic or mechanical about business cycles, which vary in duration and severity.”

Both the MAPI report and the durable goods order data confirm the strong confidence, Norman continued. “All indicators seem to be performing better than last year at the same time,” he said. “There’s been a clear increase in confidence.”

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Taking control of fleet costs, culture and course

With or without an investment in technology, a proactive approach to fleet management can improve the health of operator culture and an operation’s bottom line.

By Josh Bond, Associate Editor

For some, “fleet management” means little more than making sure there are enough redundant lift trucks to prevent downtime. Many fleet owners are finding a better way than simply maintaining old and costly backup equipment so the core fleet can be run at a grueling pace.

“The adoption of more proactive fleet management practices will soon reach critical mass, since many are in the habit of maintaining lots of old equipment,” says Pat DeSutter, director of fleet management for Yale Materials Handling. “As equipment ages, the cost of maintenance, and the potential for savings, increases.”

Before the recession, it was common to see lift truck acquisitions considered a maintenance, repair and operation (MRO) cost of doing business, an expense not particularly managed or charted. Having identified the potential for efficiencies, many fleet owners have had difficulty navigating the array of products that fall under the broad category of fleet management solutions. More challenging is the cultural change an effective program requires, with or without an investment in technology.

“It is absolutely possible to begin doing some fleet tracking without dramatically changing the culture or the use of technology,” DeSutter says. “A fleet management program can help build a surgical understanding of fleet costs, create a solid baseline and identify the hurdles in justifying any investment or cultural change.”

With fleet management, there’s no “add water and stir” recipe, DeSutter says. The process of exploration can be daunting for someone looking for hard returns on investment. A good justification should include up-front costs and, more importantly, the ability to project costs based on courses of action.

In most cases, the brunt of responsibility for executing a fleet management program will fall to operations. However, DeSutter suggests it takes three parties in an organization to make the program work. Operations must adhere to ever-improving practices on a day-to-day basis while monitoring costs in a way that is readily available to procurement. In parallel, the financial team should work to understand the ROI model specific to their organization as they assess the cost of the fleet. Some businesses would do well to carve fleet costs out of the MRO placeholders and give them a dedicated place on the expense line, DeSutter says.

With costs in check, the operator culture can begin the transition from “rear-view mirror” to forward-looking. “Historically, training and accountability is more reactive,” DeSutter explains. “You find out after the fact that something happened, and it results in a corrective action. This leads to a disciplinary instead of a constructive atmosphere. With or without technology, better and more relevant data will provide more opportunity to drive a culture based on good driving habits.”

Josh Bond is Modern’s associate editor and can be reached at jbond@peerlessmedia.com
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Reusable plastic bins and totes store and organize inventory in virtually every industry. Used by manufacturers and distributors to support 5S (sort, straighten, shine, standardize and sustain) and lean initiatives, virtually all of these bins and totes are marked with a label. That label is commonly an adhesive-backed paper sticker bearing text information and bar codes for scanning.

But, what happens to the label when it’s time to reuse those plastic bins and totes? It’s often peeled off…mostly.

“Removing old, sticky labels is costly, time consuming, and frequently leaves an ugly residue on the surface of the bin or tote,” explains Jim Rastetter, vice president of sales for Aigner Label Holder.

However, it’s important to get the old label off entirely. That’s because a buildup of multiple labels—or an uneven surface protruding behind a new label—might make bar code scanning difficult.

Those concerns can prompt companies to dedicate a surprising amount of time and labor to label removal, Rastetter says. Because of that, Aigner developed two different types of clear plastic label holders that work directly with bins and totes.

The Bin-Buddy clear plastic sleeve has a self-adhesive back that can be applied to plastic containers that lack pre-molded label slots. The Tri-Dex heavy-duty, clear PVC plastic label holders snap into the standard sized, pre-molded label slots of any major bin or tote manufacturer. A tri-fold construction holds the label in place.

With both systems, changing the label is as simple as pulling the old one out and sliding the new one in its place. Pre-perforated paper inserts that are laser and ink jet printer compatible are included. And, because the label inserts are adhesive-free paper, any color stock can be used for color-coding and organization, Rastetter adds.

“The label holders and inserts provide a 50% cost savings in materials as well as 65% in labor savings by eliminating application and removal self-adhesive labels and their remaining residue,” he says.

Additionally, the label holders ensure that the labels sit straight. “It can be tough to orient an adhesive label perfectly straight, over and over, when applied by hand,” Rastetter says. “These products generate the neat, orderly appearance that is particularly important to facilities following 5S and lean practices.”

Sara Pearson Specter is an editor at large with Modern and can be reached at sara@saraspecter.com.
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Voice is the enabling technology that allows the Wyoming Liquor Division to pick (top) and ship all orders received before noon for next day delivery, says division director Dan Noble.

A growing business. Lack of space. More split-case picking. An increasing number of SKUs. And, more special orders.

Those operational challenges will sound familiar to many operators. They were the driving force that led the Department of Revenue Wyoming Liquor Division to build a new 145,000-square-foot distribution center in Cheyenne in 2012.

In the new facility, voice recognition technology (Datria Voice from Knighted, an Intelligrated company, knighted.com) ties together the replenishment, conventional case picking and mechanized split-case picking processes. The technology also enables the state agency to meet the increasing demand for new products, special orders and more mixed cases than ever, while providing next day delivery from one location to more than 1,200 retailers located across the state—a very big state.

“We promise to pick and ship all orders received before noon for next morning delivery anywhere in the state,” says Dan Noble, director of the Department of Revenue, adding that Wyoming Liquor ships more than 900,000 cases a year today. “In the old facility, we were running out of space, we were short of...
dock doors, we needed to replenish products faster, and we needed more throughput in picking.”

Voice automation delivered on all counts. Take case picking as an example: In the old facility, associates were picking 60 cases an hour with bar code scanning. Today, they are picking 100 full cases an hour using voice and redesigned processes. “We chose voice for our new split-case line,” adds Greg Cook, administrator of the Wyoming Liquor Division. “We were unexpectedly pleased with the improvement in efficiency in case picking and replenishment.”

What’s more, Wyoming Liquor chose to go with a voice-over IP (VoIP) solution. Instead of the mobile computer and head set configuration common to conventional voice solutions, the technology deployed by the liquor division uses rugged wireless phones that communicate with the facility’s existing phone system. This, in turn, integrates with the facility’s warehouse management system (WMS). In a sense, warehouse associates are literally phoning it in—placing a wireless phone call to accomplish their tasks.

Along with improved productivity, the division’s solution provider was able to make changes on the fly through the cloud as the vendor tweaked new ways of doing things while implementing its processes. “We never missed a
day of productivity to make changes,” says Cook. “Our supplier could key into the system and make real-time changes while we were still out on the floor picking.”

The end result is that the new distribution center is getting out more product on one shift working a normal 40-hour week. “We have less overtime and morale is up, even as the number of split-case orders is going up,” says Cook.

Planning for growth
Wyoming is a big state with a dispersed population and a large tourism industry. It is also one of 18 “control states,” where the state controls the wholesale distribution of wine and spirits to licensed retailers.

It’s run more like a business than a government agency. The state charges a 17.6% markup and an excise tax on the products it sells; all retailers pay the same delivered cost, regardless of where in the state they are located. Although the wholesale cost and distribution is controlled, retailers set their own prices.

Customer service is top of mind. To make good on its promise of next morning delivery, the agency manages the receipt, storage and picking processes in its DC, but turns over loading, shipping and last mile delivery to a third-party provider.

By all accounts, business has been good—maybe a little too good for the old 100,000-square-foot location. In 2013, the agency shipped 45,785 more cases over the previous year, a 5.52% increase. What’s more, the demand for variety—both in the number of SKUs offered to the public and the number of split cases—was and is on the rise. For example, the facility stocks 2,300 SKUs and offers all of them in full-case or split-case quantities. However, customers can special order an additional 31,000 SKUs in full-case quantities. “We may not have the big wine and spirits outlets you find in a bigger state,” says Noble, “but our consumer is savvy thanks to the Internet. They are demanding more of the retailer than ever before.”

Meeting the demand for split-case picking and the handling of special orders was putting a strain on the old facility, according to Cook. “For starters, we needed more space,” he says. “We were also constrained at the dock because we only had seven doors and they handled both receiving and shipping. Finally, we didn’t have a separate area to pick individual bottles for split-case orders. Everything was picked to a tugger and confirmed with a scanner. It involved a lot of travel through the warehouse and a lot of labor.” Overtime was common, he adds.

The need for efficiency
Planning for a new facility began in 2011. Cook and his warehouse team laid out several goals for the new design:

- **More dock doors:** With additional volume and trucks, Wyoming Liquor wanted to separate receiving and shipping. The new facility has 17 doors, instead of seven, including 10 for shipping, five for receiving and two set aside for pick up and local delivery.

- **Create more space and replenish faster:** One of the bottlenecks to meeting service-level agreements within a normal shift was the replenishment process. The old facility primarily relied on single deep pallet rack for storage. The new facility features four- and two-deep push-back racking that is reserved for the fastest moving products. That means a picking lane is replenished less frequently. “We can replenish our fastest-moving items with fewer lift truck moves,” Cook says. What’s more, associates pick full cases right from the push-back rack.

- **Develop a more efficient full-case picking system:** Picking in the old facility was paper-based and each pick ticket represented just one order. That meant an order picker might
travel through the whole warehouse for just five or six cases. Instead, Wyoming Liquor wanted to create a process that would direct the associate to pick multiple orders simultaneously and get more cases on each cart.

- Develop an efficient bottle-picking process: The old facility did not have its own split-case bottle picking area. Instead, full cases and split cases were picked to tuggers pulling carts. A new goal was to develop a separate process for split-case picking to reduce travel time.

**Bringing in voice**

To meet those goals, the team at Wyoming Liquor realized they needed to bring in new technology to automate processes. “We wanted to be hands free, more efficient and safer,” Cook says.

After visiting other liquor distributors, the choice came down to either a voice- or light-directed solution. Between the two, voice seemed the better choice for this facility. “We felt we would require too many lights and too much maintenance of the system to be economical,” Cook says. Voice also appeared to be more adaptable to the goal of picking multiple orders at a time.

The next decision was whether to go with a conventional voice or a VoIP solution. Although conventional voice has been in the field longer, Wyoming Liquor believed that the VoIP solution offered several advantages.

One was the cost of the hardware. “The traditional devices we looked at were $2,500 to $3,500 per unit,” says Cook. “Our wi-fi phones cost about $400 each. They were also lightweight and supported Bluetooth headsets.”

Another selling point was the way in which the voice software integrated with Wyoming Liquor’s other software systems. “Other systems wanted each device to integrate with our enterprise resource planning (ERP) system, which meant that we would have to upgrade the voice system every time we upgraded our ERP system,” Cook

Voice also directs replenishment activities (top right) and directs bottle picking in the split-case area. All told, the new facility is shipping more than 900,000 cases a year, with room to accommodate growth.
system report

says. “Our voice solution is a middle-
ware solution that runs on its own
stand-alone server.”

The VoIP infrastructure did require
an increase in the number of wi-fi access
points than were required for bar code
scanning, but those were installed as
part of the new warehouse. The cost
was offset by savings on workers’ mobile
devices. There was also the cost of add-
ing telephony to support the increased
number of wireless phones, but this was
accomplished with a single Cisco router
that conformed to State standards. Cook
contends that the additional costs were
more than off-set by the ease of making
changes in the system, on the fly, as they
rolled out new processes.

“Since our solution provider could
access our system through the cloud,
we never had to shut down to write
new code, test the change and then go
live,” he says. “We made the changes
while we were operating and contin-
ued to function. That more than off-
set the additional cost of the new tele-
phony system.”

Changing processes
The new facility opened for business
in February 2012. The next year was
spent refining the case and split-case
picking processes. The makeover
began in the full-case pick line, with
the transition from bar code-directed
single order picking to voice-enabled
multiple order picking.

In the old process, an associated trav-
eled on a tugger throughout the ware-
house to pick a few cases for one order;
picks were confirmed by a bar code
scan. In the new process, the associ-
ate picks multiple orders and gets many
more cases per trip through the ware-
house; the tugger pulls one cart for up to
30 cases or two carts for up to 60 cases.
Each cart is color-coded: One side
of the cart is green and the other
side of the cart is red. The associ-
ate is directed by the voice system to
the first pick location, told how many
cases to pick and whether they go to a
red or green location on the cart.
Once all the items for a batch of
orders is picked, the associate goes to
a printer that will only print the num-
ber of labels for the number of cases
that were picked. Once the cases are
labeled, the associate delivers them to
the shipping department. The combi-
nation of hands-free picking and pick-
ing multiple orders at one time has
boosted productivity in the full case
picking area from 60 to 100 cases per
hour, a 67% improvement.

“This was a new facility with new
technology and new processes, which
can cause anxiety,” says Cook. “However,
once we had designed the new pro-
cesses, we had associates up and rolling
in a very short period of time.”

Voice technology was also applied
to replenishment processes. Instead of
relying on paper or bar codes, associ-
ates now receive bulk storage location
and product information, the quantity
to be picked (anywhere from a full pal-
let to a tier) and a replenishment loca-
tion over the voice system. The use of
push-back racks means picking loca-
tions are visited less often.

The final step was installing a con-
veyorized pick module for split-case
picking. The area is 300 feet long, with
an aisle of case flow rack on either side
of a conveyor system, which includes
a powered roller conveyor flanked by
gravity conveyor on each side. Each
side of the case flow rack is divided
into four work zones. That allows for
eight pickers to work simultaneously on
orders at one time.

Since both automation and the
voice system were new to the facil-
ity, the process evolved over a period
of a year. Cook says Wyoming Liquor
could have worked faster, but chose
to ease into the new system rather
than disrupt operations. It began as a
color-coded manual process; pickers
were issued color coded cartons and a
list of the items for each carton. They
worked on six orders at a time. After
the transition to voice, pickers work on
36 orders at a time and pick to alpha-
betized cartons, with each letter asso-
ciated with an order.

When associates log in to their
headsets, the system tells them what
items go into each of the alphabetized
cartons. Once the orders have been
picked, a team leader at the head of

In the receiving area, incoming
merchandise is verified against a
purchase order. Pallets then receive
a license plate bar code label and
are ready for storage.
It’s not about the ABC’s anymore. It’s ALL about the XYZ’s.

With the 3D-MATRIX Solution®, SSI Schaefer opens up a whole new dimension in warehouse automation. The cutting edge concept eliminates the need to ABC classify your inventory and opens up your warehouse from all sides utilizing the XYZ axes, allowing for highly-dynamic sequencing without bottlenecks while simultaneously storing and picking pieces, cases and whole pallets in a single system.

The patented solution offers maximum flexibility and future-oriented scalability for any industry. With a 3D-MATRIX Solution® from SSI Schaefer, every SKU can be retrieved from its location in the MATRIX and sent to any picking station without a decrease in performance, reaching efficiencies never before imaginable.
the conveyor line places an alphabetized cone on the powered conveyor—say the letter A. As the cone passes through a zone, the order picker pushes his or her A cartons onto the powered conveyor behind the cone. At the end of the line, the orders are consolidated into cases for shipping and turned over to the third party for palletizing, loading and delivery.

Now that the system is up and running at full speed, the facility is filling an average of 165 split case orders, or up to 12,000 bottles, per day.

As a final move toward efficiency, Wyoming Liquor staggered the way the facility processes orders to make certain that the bottle line is kept busy once it starts rolling. The shift starts off with case picking in the morning, followed by special orders, while bottle orders build up. In the afternoon, part of the workforce transitions to the split-case line to fill out the day. “Moving associates around has really taken the monotony out of the day,” says Noble. “A guy in receiving may also do specials, replenishment and the bottle line before the end of the shift.”

The improvements in productivity, efficiency and employee morale have set the stage for continued growth and better customer service. “We have the space to grow and systems in place to handle the extra volume on just one shift,” says Cook. “And, we can continue to add the special orders and split cases that are so important to our customers.”

### Picking by voice

With a new voice-directed picking system, Wyoming Liquor Division is handling more split-case picking, additional SKUs and higher customer service levels.

With operations powered by a voice-over (VoIP) voice recognition system, Wyoming Liquor Division is capable of picking up to 12,000 bottles and 3,000 cases per day to serve more than 1,200 retailers across the state. Orders received by noon are shipped that day for next day delivery.

Receiving: Palletized and sheeted materials are unloaded by lift trucks in the receiving area (1). Once the shipping documents have been verified against a purchase order, a license plate bar code label is printed for each pallet and the inventory is received in the warehouse management system (WMS). The pallets are staged for put-away into storage.

Putaway: The WMS determines the storage location. Pallets may be put away in a bulk storage area reserved for the fastest moving items (2), in single deep pallet rack (3), double deep pallet rack (4) or four deep pallet rack (5). Reserve storage locations are located on the upper levels of the pallet rack storage areas while picking is done from the lower levels in the racks. As a rule, the system will pick a spot closest to the pick location for that item to minimize travel time during replenishment. A lift truck operator scans the pallet into the right bin location. Special orders are stored and processed in a special area (6).

Replenishment: Replenishment is directed by the voice system. When an associate receives work instructions over the headset, he first visits the pick location to confirm that material is needed. Next, the associate travels to a storage location in the reserve storage area. Once there, the associate speaks a product number to confirm the location. The system then indicates the quantity of product required, which could range from a full pallet to a few cases. Once the product is picked, the associate travels to the replenishment location and confirms the putaway by voice.

Case picking: Case picking is also directed by the voice system. Associates drive a tugger to the pick destination in one of the storage areas (2, 3, 4, and 5) and picks to one or two carts. Orders for 30 cartons or less use one cart; the maximum order is two carts and up to 60 cases. The carts are color-coded; one side is designated red and one side is designated green. To initiate the process, the system sends the associate to the first pick location. Once the associate speaks a check digit to confirm the location, the system indicates how many cases to pick and whether it is a red or green order. Once the associate confirms the pick, the system chooses the next pick location. Once all the cases for an order have been picked, the associate travels to a printer to retrieve

<table>
<thead>
<tr>
<th><strong>Department of Revenue</strong></th>
<th><strong>Wyoming Liquor Division</strong></th>
<th><strong>Cheyenne, Wy.</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SIZE:</strong> 145,000 square feet</td>
<td><strong>PRODUCTS:</strong> Wine and spirits</td>
<td></td>
</tr>
<tr>
<td><strong>SKU:</strong> 2,300 in storage plus access to 30,000 for special orders</td>
<td><strong>THROUGHPUT:</strong> 920,000 cases per year</td>
<td></td>
</tr>
<tr>
<td><strong>EMPLOYEES:</strong> 17 full time; 7 part time in distribution</td>
<td><strong>SHIFT PER DAY/DAYS PER WEEK:</strong> 1 shift per day; 5 days per week</td>
<td></td>
</tr>
</tbody>
</table>
and apply bar code labels for the cases. From there, the cases are delivered to the shipping area (7), where they are turned over to a third-party contractor that manages packing, loading and shipping.

**Split-case (bottle) picking:** Voice-directed split-case picking takes place along a 300-foot-long bottle line (8). In that area, 16 associates can simultaneously pull from work on up to 36 orders at a time. Team members work in zones, picking from case flow rack (9) on either side of a conveyor system (10). Split-case orders build up during the early part of the day to ensure that the area can keep busy once picking begins.

To initiate the process, associates go to their stations and log in to their phones to ensure that everyone is in the right zone. Then they ask the system to get them work and are directed to pick items to cases. Each case has a letter on the side designating a specific order, such as an A. Once an order is complete, an order starter at the head of the line puts a flag with a letter on the conveyor. When the flag with an A reaches a zone, the associates in that area put all of their cases with an A on the conveyor behind the flag.

At the end of the line, order consolidators verify the bottle count and consolidate the bottles into fewer cases. Once complete, the cases are labeled and delivered to the third-party contractor in the shipping area (7) for loading and shipping.

Both bottles and cases may also be picked from an additional pallet pick area (11) on the north side of the building. □
A mid sweeping change throughout the supply chain, nimbleness has become the primary weapon with which to combat uncertainty. This change has prompted some to invest heavily in big software projects intended to replace the habits of the past century with the foundations for the future. Others have invested incrementally, taking advantage of solutions’ scalability to target and solve each problem in turn. As a result, software applications have evolved from monolithic to adaptable, a transition reflected in spending and adoption patterns.

This is one of the many trends outlined in Modern’s 2014 Software Usage Survey, conducted in March 2014. To better understand how readers use supply chain software to optimize their warehouse and distribution operations, Peerless Research Group (PRG) recently surveyed subscribers of Modern as well as a sample of recipi-
ents of our e-newsletters. Judd Aschenbrand, director of research for PRG, notes a clear upward trend in the adoption of 21st century software, automation and technology.

“These operations face a range of issues and challenges, from automation, cycle times and tracking to systems implementations,” Aschenbrand says. “Managers have one headache after another and are increasingly driven to deploy technology for problem solving.”

John Hill, director for supply chain consulting firm St. Onge, adds that “Aleve, Advil and aspirin might help with those headaches, but it’s software that can directly affect the synchronized flow of materials and related information to strengthen supply chain performance and provide managers the relief they are seeking. This report answers the questions: which software, for what applications, and in what sequence?”

Deliberate spending plans
The survey reflects the plans and perspectives of 134 qualified respondents. As with last year’s survey, roughly a quarter of respondents consider themselves innovators or early adopters of warehousing and distribution technology, one in seven are slow or among the last to adopt and 62% cautiously embrace change or take a wait-and-see approach with an eye toward second-generation technology. In total, the field is now split cleanly down the middle: Half of respondents state that their use of warehouse and distribution software increased in the past two years, and half say that their usage stayed the same.

When asked how the current economic climate is affecting readers’ approaches to software adoption, the 2013 and 2014 breakdowns are virtually unchanged; readers are moving forward with software investments this year (21.1%).

How would you best describe your company’s adoption of technology for your materials handling procedures?

- Innovators
- Early adopters
- Cautiously embrace change
- Take wait-and-see approach
- Slow/Among last to adopt technology

Source: Peerless Research Group (PRG)
holding off this year (25.6%), moving forward cautiously (35.3%) and upgrading existing software instead of buying new (16.5%). About 8% of those are making an investment plan to outsource software implementations.

Aschenbrand says the number of respondents holding off seems high given the apparent benefits of modern software, but he suggests these organizations are not simply waiting. “The solutions they need are on their radar,” he says, “and many are making preparations to move forward when the time is right.”

According to Hill, “The time will be right when the prospective user has carefully crafted the value proposition and prepared a fact-based investment proposal that resonates with senior management.”

For those prepared for an outlay, half expect to spend less than $100,000 in the next year, a quarter will spend between $100,000 and $500,000 and nearly 8% foresee supply chain software spending of more than $2 million. This year’s average spending is $663,000—a sizable jump from last year’s $572,000 average and well above the roughly $400,000 reflected in both the 2012 and 2011 surveys.

The makeup of each survey base can differ dramatically from year to year, but it’s possible to compare the amount of spending as it relates to the size of the business. This year, a quarter of respondents bring in less than $10 million per year, another quarter between $10 million and $50 million, and about 17% are above the $1 billion mark.

The median annual revenue for 2014 is $81.8 million, up from $70 million in 2013 and $42.8 million in 2012. When analyzed next to median spending in recent years (2014 had $113,000; 2013 had $92,170; 2012 had $86,850) the revenue/outlay ratios indicate software spending was a priority in 2012 (2:1), fell somewhat in 2013 (1.3:1), and is now back on the rise (1.4:1).

Challenges
This year’s survey asked readers about the challenges they have experienced or might anticipate when adopting or implementing warehousing and distribution software applications.

How has the current economic climate changed your company’s approach to adopting materials handling management software?

- We are moving forward with new software investments this year: 30%
- Plan to hold off on our software investments this year: 20%
- We are scrutinizing software investments and moving forward cautiously: 40%
- We plan to upgrade existing software instead of buying new software packages: 16%
- We plan to outsource more software implementations: 4%
- Other: 8%

Source: Peerless Research Group (PRG)
Concerns over a new system’s ability to integrate with existing systems have held at the lowest levels in recent years of the survey (about 42%). Total cost of ownership (43%), funding (40%), substantiating an ROI (37%), corporate approval (36%) and user acceptance (28%) continue to rank high on the list.

In the last two years, respondents have sought to overcome an assortment of problems by implementing a software application in their warehouse or distribution operations. Omni-channel distribution, labor reductions, space utilization, inventory tracking and cycle time reduction top the list. Improvements to automation such as automated storage and retrieval, bar coding and scanning and conveyor controls are also top of mind. Some still struggle to finalize their enterprise resource planning (ERP) or warehouse management system (WMS) implementations, while others cite general problems with computer and data integration technologies.

When asked which software solution or application they would immediately implement if they could, respondents

Which of the following software applications are currently used in your warehousing and distribution environment?

- Warehouse management system (WMS, inventory management, etc.) 65%
- Supply chain management and planning software (SCMP, demand planning, etc.) 31%
- Warehouse control system (WCS) 28%
- Transportation management system (TMS) 24%
- Asset tracking 22%
- Labor management system (LMS, workforce management software) 21%
- Software to enable new picking solutions (such as pick-to-light, voice-directed picking and goods-to-person picking) 14%
- Yard management system (YMS) 13%
- Slotting software 8%
- Other 8%
- None of these 12%

Source: Peerless Research Group (PRG)

What systems are you planning to evaluate, purchase or upgrade within the next 24 months?

- Warehouse management system (WMS, Inventory management, etc.) 29%
- Transportation management system (TMS) 23%
- Supply chain management and planning software (SCMP demand planning, etc.) 19%
- Software to enable new picking solutions (such as pick-to-light, voice-directed picking and goods-to-person picking) 18%
- Asset tracking 16%
- Labor management system (LMS, workforce management software) 16%
- Warehouse control system (WCS) 16%
- Slotting software 13%
- Yard management system (YMS) 9%
- Other 5%
- None of these 25%

Source: Peerless Research Group (PRG)
overwhelmingly said a WMS. Other favorites included automated picking, paperless warehouse, RFID, slotting software and voice picking solutions.

**Usage of software applications**
Readers already using supply chain management software identified the seven most important objectives: inventory visibility (72%); demand planning (67%); order management (64%); procurement (58%); vendor/supplier collaboration (50%); manufacturing (39%); and event management (17%). These are the same initiatives driving other respondents to evaluate expanded software usage, with nearly half of them pursuing improved inventory visibility or order management.

As in year’s past, the most commonly used software application is WMS followed by supply chain management and planning software (SCMP). Roughly two out of three respondents are currently using a WMS, a slight increase since 2011 when 60% reported using a WMS, while 31% report using planning solutions. As a foundational solution, WMS is increasingly sharing turf with warehouse control systems (WCS), which are in use in 28% of respondents’ facilities, second only to WMS and SCMP. More than 20 respondents plan to evaluate or purchase each of the following in the next two years: WCS, asset tracking and labor management systems (LMS).

A fifth of all respondents are using labor management software, and another fifth plan to evaluate LMS in the next two years. The adoption of engineered labor standards has ticked upward among this year’s surveyed group, with 40% now running ELS, a quarter planning to, and 36% expressing no interest. At the same time, the number of respondents using or considering a program to tie employee payment to productivity improvements has fallen sharply from a roughly 50/50 split in last year’s survey. Now just 15% are using, or will use, incentive programs.

**What challenges have you experienced or would you anticipate when adopting or implementing these types of materials handling software applications?**

- Compatibility with existing systems: 43%, 41%, 43%
- Total cost of ownership: 33%, 43%
- Integration with existing software applications: 50%
- Funding: 34%, 33%, 41%
- Compatibility with our host/legacy systems: 40%, 33%, 37%
- Substantiating ROI: 28%, 37%
- Whether our process efficiencies will improve: 39%, 36%
- Corporate/Management approval: 29%, 29%, 36%
- Whether it will truly lower our supply chain operational costs: 26%, 29%, 32%
- Lack of resources to implement, manage, maintain: 29%, 38%
- Performance issues: 34%, 32%, 29%
- User acceptance: 37%, 35%, 28%
- Vendor technical support: 31%, 28%, 26%

**Approximately how much will your company spend on supply chain software for your operation including license, integration and training in the next 12 months?**

- Less than $100,000: 49%
- $100,000 – $499,999: 26%
- $500,000 – $999,999: 10%
- $1 million – $1.9 million: 8%
- $2 million – $4.9 million: 3%
- $5 million or more: 5%

**Average planned spend**

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<tr>
<th>Year</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
</tr>
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<tr>
<td>Median planned spend</td>
<td>$94,000</td>
<td>$98,850</td>
<td>$92,170</td>
<td>$113,333</td>
</tr>
</tbody>
</table>

Source: Peerless Research Group (PRG)
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For all the hype about cloud computing in recent years, when it comes to the cloud for deploying supply chain execution (SCE) software such as warehouse management system (WMS) solutions, the numbers tell a pretty modest story. While some other enterprise software categories such as customer relationship management (CRM) have seen cloud solutions catch on in a significant way, the SCE segment lags behind. For instance, cloud-based WMS sales in 2013 only accounted for about 8% of the WMS market, according to Chad Eschinger, an analyst with Gartner Research.

By comparison, Gartner estimates that 45% of the CRM market was cloud-based in 2013, while the overall supply chain management software market was 21% cloud in 2013.

“Cloud adoption for warehouse management is pretty nascent today,” says Eschinger. “We haven’t seen a huge onslaught of activity. There are some vendors winning deals out there, but I would call many of these less sophisticated warehouse environments.”

ARC Advisory Group, another analyst firm, also pegs the cloud share of the WMS market at less than 10%, though it sees more externally focused logistics solutions such as global trade
solutions
for the warehouse
management (GTM) at much higher cloud penetration.

Why are some cloud-based SCE solutions, particularly WMS, not catching on strongly? There are multiple theories as to why, led by the notion that users aren’t quite ready to trust the cloud for a transaction-heavy, more internally oriented systems, which are critical to tactical execution. For instance, notes Eschinger, the enterprise resource planning (ERP) market also has relatively low cloud sales, and the categories with higher rates tend to be areas like CRM or human capital management.

Other hurdles for cloud-based WMS include the perception that cloud solutions can’t handle large sites, or that in far-flung regions cloud reliability becomes a factor. But suppliers of cloud-based SCE solutions say the realities of the market are changing. Cloud WMS, some suppliers contend, is scaling up to handle bigger, more complex environments, including integration with automated materials handling systems.

“One myth out there is that cloud WMS does not offer rich, Tier 1 functionality—that the solutions are less mature than on-premise solutions,” says Larry Ferrere, chief marketing officer for LogFire, a cloud-based vendor of SCE solutions including WMS. “While it’s fair to say that cloud solutions generally tend to be less mature than on-premise ones because the cloud segment is much newer, that doesn’t mean that a particular cloud solution cannot be functionally rich.”

The proof points, says Ferrere, come from LogFire’s customer base, where users such as Supermercados Peruanos, a large grocery chain in South America, has 350 users of the LogFire Cloud WMS at its main distribution center. That site also has automated equipment such as conveyors and sortation systems integrated with the WMS.

For end-user organizations, cloud solutions promise lower upfront costs because there are no servers to install in-house, and also because the software is paid for on a subscription-based “software as a service” (SaaS) model. To assess the state of cloud SCE, users need to know about approaches to cloud architecture, and must judge for themselves whether a solution has the depth and flexibility to meet evolving needs.

### Why architecture matters

Most cloud solutions are offered under a SaaS model, and many, but not all, feature a “multi-tenant” architecture. Multi-tenant means that all user companies tap the same code base for the core functionality, with a separate layer of software to handle customizations such as workflows, alerts, reports, forms and labels. The users of a multi-tenant system can’t change the core software, but that doesn’t mean they can’t adapt the system, explains Ranga Bodla, senior director of industry marketing for manufacturing and distribution at cloud-based vendor NetSuite.

“We allow you to customize,” says Bodla. “The changes can be as simple as look and feel, or more complex, like adding tables, adding fields or entire application workflows. All of these changes, when we do an upgrade, will seamlessly migrate to the new version.”

A multi-tenant architecture, says Bodla, avoids a common pitfall of internally run software: modifications to core code that get users and vendors alike bogged down in release migration work. “From a research and development perspective, we’re able to focus all of our attention on the innovation for the next version of the software, as opposed to band-aiding multiple older versions,” says Bodla.

NetSuite’s customization platform was tapped by eBizNET Solutions to create a suite of cloud-based SCE applications, including a WMS, aimed at small to mid-market companies.

“I think it’s a misconception to believe that a multi-tenant cloud system can’t be customized to meet specific business needs,” comments Bodla. “We allow you to customize. For example, we have a multi-tenant solution for our e-commerce customers. They are in a different industry than our other customers, so they have their own workflow needs. We allow them to customize the work processes, the reporting, the handles, the labels. They can do it all in this cloud environment — they don’t have to do it internally.”
Cloud WMS is scaling up to handle bigger, more complex environments.

For Epicuren, a user of NetSuite’s cloud ERP solution and eBizNet’s WMS, a key benefit was speedy implementation. Epicuren, a Laguna Hills, Calif.-based manufacturer and distributor of skin care products, was able to implement the joint solution in just four months, going live in January 2012, according to Brian Douglas, project manager for Epicuren.

The WMS functionality met Epicuren’s need to have tight control over lot- and expiration-date sensitive materials and order planning processes, says Douglas, while the cloud model supported rapid implementation. “Speed of implementation for our WMS solution was a driving factor for us,” says Douglas.

Fit and function
Some cloud solutions are aimed primarily at small- to mid-sized companies, or relatively smaller sites of large companies. Most of eBizNet’s WMS users, says Geddam, have five to 50 users, and transaction volume is less than 20,000 order lines per day.

LogFire, however, positions its cloud WMS as capable of handling large sites. According to Ferrere, this means the solution not only needs to handle larger user counts and volumes, but also have multi-site and “multi-entity” capabilities.

Additionally, says Ferrere, a Tier 1 WMS today also should support multi-channel fulfillment, meaning the system needs to be just as adept at managing items as it does cases, while also being...
able to stage goods for parcel shipments. The trouble in meeting the multi-fulfillment challenge with WMS, says Ferrere, is that in many cases, on-premise solutions that were heavily customized have become so bogged down by release migration issues that the user companies can’t get onto newer software geared for multi-channel needs.

According to Diego Pantoja-Navajas, LogFire’s founder and CEO, LogFire’s WMS was conceived “from the ground up” to be a Tier 1 level solution capable of handling larger, complex operations. One user site, he says, is processing about 400,000 order lines per day. “These are large facilities with fast moving items,” he says.

Deploying a cloud WMS for a larger site still takes plenty of planning in terms of how to best configure the solution to meet desired procedures, and proper testing of integration to automated systems. In other words, there is no shortcut to business requirements planning and integration steps, notes Pantoja-Navajas. But with cloud WMS, he adds, it’s simple for the vendor to allocate more capacity if the user company expects a stretch of heavy volume during peak seasons, or for other rapid changes.

Cloud reliability issues
Satish Kumar, a vice president with Softeon, which offers a cloud-based WMS, agrees that it is easy for a cloud solution to scale up to accommodate more users or higher peak volumes. “We host on Amazon (Amazon’s cloud infrastructure), so it’s elastic—we can expand the capacity as much as needed in just a few minutes,” Kumar says.

But this potential strong suit of the cloud—the ease of tapping large server farms run by someone else—also carries a potential downside in that if you lose your cloud connection, you’re solution access goes down. Clint Reiser, a research analyst with ARC, says the reliability of cloud connections is an issue that potential users should examine carefully, especially in emerging markets where telecommunications may be unreliable.

Cloud vendors, however, say having a back-up cloud connection for each site can mitigate cloud connectivity concerns. Users also typically need backup power protection for the site’s network gear. Such reliability measures, however, are already normal practices for industrial sites in emerging markets, says Geddam. “It’s easier and cheaper today to have redundant cloud connectivity than to try have redundant systems and data center infrastructure at every single site,” he says.

Kumar agrees that performance concerns can be dealt with easily. In Softeon’s case, it offers the option of local server running a software agent to handle time-sensitive WMS interactions such as label printing or communications with automated materials handling systems.

To date, the SCE solutions that have done best at the cloud are categories such as transportation management and GTM that are naturally more network-centric. But as more vendors come forward with cloud solutions with

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**Cloud SCE not strictly a ‘pure-play’ proposition**

The competition to capture the market for “cloud-based” warehouse management system (WMS) software and other supply chain execution solutions isn’t limited to pure-play cloud vendors. Established vendors who got their start with “on-premise” solutions also may offer cloud solutions.

For example, Epicor Software, a provider of enterprise resources planning (ERP) and WMS solutions, is enhancing its lineup of cloud-based solutions, according to Erik Johnson, Epicor vice president of technical strategy. For four years, the supplier has offered a cloud ERP and warehouse management solution called Epicor Distribution Express, which has about 300 deployments and is aimed at small- to mid-sized organizations. The solution features a “multi-tenant” architecture that allows for easy upgrades by separating the core functionality from the configuration layer. The “enterprise” edition of Epicor’s distribution solution has been offered as a cloud-hosted solution, but until now, has not been multi-tenant.

With the next release of the enterprise edition in May 2014, says Johnson, the solution will have a multi-tenant architecture. “This will provide a lot of customization flexibility, and because this ability separate from the base code, it isn’t going to interfere with users’ ability to easily migrate their customizations,” says Johnson.

Best-of-breed WMS suppliers also may offer cloud solutions, such as HighJump Software, which began offering its “HighJump WMS in the Cloud” back in 2010, and has 12 customer organizations using it, some at multiple sites. HighJump says it uses a single instance, single-tenant architecture with the cloud WMS to provide the same level of flexibility as its on-premise solution.

According to Craig Moore, a territory manager for HighJump, the architecture of HighJump’s solution makes a performance difference in that when users need information from the cloud, rather than having to transmit all data associated with a larger process, the system breaks requests down into bite-sized packets of information. “These packets are small enough that they don’t impact response time, even when you have higher order volumes and many users,” said Moore.

Pure-play cloud SCE vendors also report that in some cases, they have customers who want to stay with an on-premise solution for ERP or WMS, but use a cloud solution for functions such as spare parts management, transportation management or reverse logistics. “There are many customers who want to take a hybrid approach,” says Sitaram Geddam, founder and CEO of a cloud SCE software vendor eBizNet Solutions. “Some users will have an internally run ERP or WMS backbone, but will use one of our cloud solutions for extended functionality.”
Optional use of a local processing layer option for a cloud WMS

Softeon offers users of its cloud WMS solution the option of deploying a local server with a software agent to rapidly handle time-sensitive system communications.

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When visualizing industrial robots, the classic six-axis arm comes readily to mind. In manufacturing applications, these robots have spent decades living up to the definition of the word robot as “a device that automatically performs complicated or repetitive tasks.” While there is no shortage of complication and repetition in warehousing and distribution, robotic automation has had to develop a whole new skill set to tackle the challenges of those unstructured environments.

In addition to conventional robotic arms, solutions such as goods-to-person systems, automatic guided vehicles (AGV) and shuttle-based automated storage and retrieval systems (AS/RS) can often be bundled under the broad umbrella of robotics. In an effort to overcome variables like SKU proliferation, labor shortages and smaller, more frequent orders, both the hardware and the software of these systems have come a long way in a short time. While some solutions take humans entirely out of dull, dirty or dangerous tasks, the majority of robotic implementations are now focused not on replacing workers, but optimizing them.

“Humans are the most dynamic piece of equipment you could ever deploy,” says Adam Brown, manager of integrator partners at SSI Schaefer Systems International. “They are more capable and flexible than anything—if you can minimize movement and fatigue to keep them focused on what they do best, which is dynamic manipulation.”

While possible, it is impractical to build a mobile robot with sufficient vision, dexterity and speed to go out into a warehouse
degrees of freedom
and pick an order before packing it and delivering it to the dock. “Don’t worry too much about the big, ultimate utopia of what it could be,” says Jim Lawton, chief marketing officer for Rethink Robotics. “If you look at the effortlessness with which a human can shuffle a few small items into a carton, robots are not even close.”

Instead, it is preferable to slice each application into discrete pieces to find the best place for humans, robots and related systems. This is where software comes in, granting the visibility to isolate order profiles and the flexibility to configure robots on the fly. Modern recently spoke to a few industry experts to find what they, and the robots, have learned from an assortment of present-day robotic applications.

**Distributed execution**

Robots have already proven themselves in applications such as palletizing or depalletizing single SKUs or layers and moving pallet loads. While automated solutions are readily available around the “outskirts” of a facility, Brown says that things get increasingly difficult on the picking side. “There are a number of ways to automate pallet movement, but as products get smaller, the complexity is exponentially greater,” he says.

Similarly, as orders become smaller and order sequencing more critical, the complexity of a mixed-case pallet increases. Humans will tend to outperform a robot when presented with random products and tasked with stacking them. That said, software can help retrieve items in a certain order and conveyors can present them to the robot in a predictable way. The robot
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then works in coordination with neighboring technologies instead of serving as a catch-all like many humans do. “Parallel processes and a distributed attack to the problem are usually better than a one-shot solution,” Brown says. “It helps to break out these capabilities from the robot so it’s not doing everything; seeing, orienting and grabbing with the right end effector and depositing.”

While choreographing product flow, software can take into account all product dimensions and classifications, such as heavy items that need to be stacked below light ones. As soon as an order comes in, the finished pallet is built in virtual space before the system directs how the order will be picked in reality. Part of the order might come from manual picking and part from automation, says Brown. All the decisions about how each item is picked and when it’s picked are determined by the software package, giving the robot advance notice of the items headed its way.

**Many robots, one mission**

Inside a shuttle-based AS/RS, there are even more tasks to delegate as a fleet of independent robotic shuttles coordinate the fulfillment of orders while keeping an eye on one another. The system behaves like a swarm that dispatches each mission to members of the colony in the best position to serve it, according to Miguel Pinilla Burgos, vice president of global logistics solutions for Dematic. Burgos says there are two levels of intelligence; one understands the operation and one is the colony or system intelligence.

Combined, these levels of intelligence keep the operation moving despite a failure of one shuttle, a jam somewhere in the system, or during periods of planned shuttle maintenance. “Say there are 10,000 transactions per day, per shift,” explains Larry Sweet, chief technology officer for Symbotic. “If the robots are successful 99% of the time, you might say that’s a good number, but it’s also 100 issues where someone had...
to address something, The level of reliability and availability are very high to make these systems work.”

Even when not fulfilling orders, shuttles will perform “inventory grooming” by consolidating and optimizing stored items. This means that the system is constantly repositioning the inventory it is storing and handling to optimize throughput. If the system serves totes to a goods-to-person picking station, grooming can help improve speed and picks per retrieval. Shuttle systems also sort automatically, Sweet says, eliminating the need to sequence, sort or merge downstream. “With conveyors and sorters it might not be as easy to change a physical layout or software to accommodate changes,” he says. “Both the hardware and the software need to be flexible. In terms of software, hard-coding is not preferable to ‘learning’ systems that can dynamically add or remove SKUs.”

Robots with intelligent software can work to problem-solve independently. In a traditional top-down system, the ERP drives the WMS, which controls the WCS, which drives the equipment, Burgos says. “I think that model is likely to be greatly upset going forward,” he says. “There’s no reason replenishment signals need to go up to the ERP and down again. For instance, when a demand signal comes into the packing station, it might ask for items to be delivered in the optimal sequence for packing. This propagates demand upstream, and you see processing among equipment elements instead of centralized command and control.”

Of course, a robot does not necessarily need to communicate with anything else in the warehouse, according to Matt Wicks, vice president of controls and software for Intelligrated’s manufacturing systems division. Plenty of vision-guided robotic depalletizers are stand-alone units controlled from a nearby panel. But the benefits of communication among pieces of equipment can also break down traditional barriers between warehousing and manufacturing. “We’re trying to promote that concept with our customers,” Wicks says. “Too many think that one process ends at manufacturing and then resumes separately in a warehouse or DC. There can be a lot of efficiencies in tying them together.”

Wicks offered the example of a beverage manufacturer that identified the requirements to support distribution at the point of production. Using a robotic depalletizer, conveyors, AS/RS, a case handling and sequencing sys-

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tem, the warehouse ultimately served as replenishment for order fulfillment as well as a buffer for the raw materials used for manufacturing. “They stored both unfinished and finished goods within the same AS/RS,” says Wicks. “The same tasks could have been accomplished without robotics, but it would not have made financial sense. With all of the other factors that came into the justification, robotics were critical to meeting their needs.”

Robots as employees
Many justifications for investment in robotics center on labor, but it is rarely possible to simply replace a human worker with a robot. Besides, Sweet says, “it’s not just substituting automation for a human, it’s about using it to make the human more productive.” When breaking down a process into steps suited for one or the other, it is sometimes possible to surround a conventional robot with guarding and create some sort of hand-off between humans and automation. The downside is that the cage and robot can become a monument, a fixed installation around which everything else must adapt.

Robotic hardware and software systems are increasingly geared toward intuitive interfaces that allow any worker to quickly use them.

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This is where a new generation of collaborative robot systems offers the flexibility to change position and performance on the fly. “Mass manufacturers have the ROI equation easily, but that model—one robot, one place, one task—doesn’t work for a lot of small- and medium-sized businesses,” says Ed Mullen, national sales manager, North America, for Universal Robotics. “It’s the same concept with an employee. You want him to learn a number of things, be versatile, grow, adapt and prove his value.”

Lawton at Rethink Robotics agrees, suggesting customers want to be able to ask a robot as they would an employee: “What have you been up to today? What were some challenges? What do you plan to do tomorrow?” Unlike integrated robotics dependent on specialists for programming, collaborative robots are designed to accept intuitive and gesture-based commands while operating safely in close proximity to human counterparts. Just like a human, they are also expected to “learn” a certain amount of self-sufficiency, for instance by retrieving a dropped object rather than requesting human intervention.

Some collaborative robots are accurate to four thousandths of an inch and can integrate with vision, networks or PLCs. But a robot that an average worker can use the day after it is shipped to the facility is not a system, Mullen argues, but a tool akin to a power drill. The concept seems to have some appeal; after shipping 31 robots in 2009, Mullen says his company now ships 130 per month.

Perhaps one of the biggest benefits of a robotic solution is that robots can collect data as they complete tasks. Lawton describes a customer who needed cycle time data, handed clipboards to operators and collected a lot of essentially useless information. “With a robot maintaining telemetry about tasks, you can use that data to improve the quality of the process,” Lawton says. “That’s insight you wouldn’t be able to gather otherwise.”

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It could be argued that the industry got a little ahead of itself in the early 2000s when radio frequency identification (RFID) was expected to transform supply chains overnight. The concept of the “Internet of Things” was still years away, but the appeal of digitizing physical assets and achieving absolute visibility led to some grand theories. However, although much of the early hype has faded, RFID continues on a trajectory toward widespread adoption and impact.

“People had unfair expectations that it could change the world in a couple of years,” says Michael Fein, senior product manager for RFID at Zebra Technologies. “But if you look at the technology adoption curve, RFID is not at all behind. I’d say the technology is doing fantastically well.”

Other RFID system suppliers characterize the market as “going gangbusters,” “on a very healthy evolutionary track,” and “growing at a rate significantly higher than traditional bar code growth rates.” These sentiments are backed up by RFID market research from IDTechEx, which expects the market to grow from $7.88 billion in 2013 to $9.2 billion in 2014—before more than tripling in the next decade.

The secret to this growth is not the wholesale replacement of bar codes with RFID tags, nor is it the deep pockets of sophisticated retail, healthcare or governmental entities. It’s the mindset that a mere handful of tags and a single...
reader can provide a meaningful return on investment (ROI) for a very small slice of a given process.

“My advice is to be very focused,” says Alan Melling, senior director of strategy and software at Motorola Solutions. “If you try to solve every problem in the world with RFID, your project will fail. But if you want to know about stock-outs in the underwear department, RFID could be a great solution.”

Many warehouses and DCs are already handling RFID-tagged items, but don’t know or care. That’s because many manufacturers are tagging their products at the end of the manufacturing line before packing them for shipment to the retail store. There, RFID is used to manage inventory levels in the store. Yet as one brand of underwear, one hand truck fleet and one
receiving door after another become RFID-enabled, Melling says, the gaps in visibility and value will slowly begin to close.

“What will drive adoption in the long term is the Trojan horse idea,” Melling says. “When tags are in place because one part of the supply chain sees the value, the technology becomes more appealing for others to collect data because the required investment is much less. There’s an opportunity to leverage an investment that someone else has already paid for.”

Remember: It took more than 20 years for bar codes to reach ubiquity.

Starting small
In all likelihood, bar codes will remain the standard for capturing data at specific points in a process for years to come. It is the places between those points where RFID might prove valuable. Unlike a bar code, an RFID tag constitutes a unique identifier for the tagged item—it’s not a pair of pants, it’s this pair of pants. Uniqueness is often important in e-commerce applications where value-added steps result in a change to a product, which is another piece of information RFID is uniquely able to capture.

“Any system will tell you something moved from Point A to Point B, but RFID will tell you what happened in between, by recording steps in a process as well as any state change,” says Su Doyle, head of industry programs for OATSystems, a division of Checkpoint. “Now you know both where an item is and what it is doing. From there, you can start to think about what it could be doing.”

For this data to be useful, it must feed a warehouse management system (WMS), an enterprise resource planning system (ERP) or some other system of record capable of identifying unique items. “Many WMS systems do not operate at an item level,” says Fein. “This can create complications with many legacy systems.” Then again, it might not be important to know that a certain pair of jeans was manufactured on a specific date.

Another benefit of RFID is the simple ability to count things rapidly and accurately—especially without line-of-sight or easy access. This can be an advantage in cycle counting in the warehouse or taking inventory at the shelf level in the store. Melling reiterates that the applications that succeed are very mundane. “Everyone has systems to track things, but they often don’t work the way they might like,” he says. “The system says I have five shirts in a location, but the picker sees
Agron is an official licensee for adidas, manufacturing accessories for the sports brand. When one of Agron’s major customers adopted a new RFID approach, the manufacturing company had to begin adding RFID tags to all items for that customer, amounting to about 30,000 units every week. After quickly replacing standard label printers with RFID-enabled label printers the company was able to boost inventory accuracy and reduce out-of-stock items without changing its processes.

“We process thousands of cartons a day and needed something that could keep up and encode tags reliably,” says Marc Hernandez, director of service and distribution for Agron. Working with an integrator, the company deployed the infrastructure for item-level tagging and other warehouse automation. Inventory software now controls and manages the serial numbers associated with each RFID-tagged item.

A new RFID printer/encoder (Zebra, zebra.com) provides a lower cost per label, fewer media-roll changes and fast throughput. As the printer prints the human-readable text and bar code on the face of the label, it also encodes the RFID inlay embedded in the label, providing an integrated solution with built-in error handling.

Each week, the company receives orders from the customer, typically for more than 1,000 store locations. Pickers gather products and move them to printing/encoding stations for RFID tagging, where the new equipment prints all 30,000 tags in five to six hours.

With the new printer/encoder, Agron meets its customer’s RFID directive without having to change its supply chain process or incur maintenance requirements. The new printer/encoders simply take the place of previous tag printers, which added zero time to the tagging workflow.

“From the point of view of our users, it was very smooth adding leading-edge technology to our existing process,” Hernandez says. “Additionally, the printer/encoders run without the regular outages and maintenance we had experienced with previous printers.”
high-value customers.

“In some circumstances, items got to the shipping dock and sat there for days,” Melling says. “There’s no way that’s supposed to happen in the ideal process you’ve designed.” Still other manufacturers are using RFID to manage exception handling processes, by identifying shipments that were set aside because they have a problem that needs to be addressed later. RFID allows them to quickly sort through the shipments to identify the next one to be worked on. “I have seen capital goods manufacturers set shipments aside because they know there’s a problem, and they need to sort through it, but later never comes,” Doyle says. “Some manufacturers have boxes of incorrect shipments stacked to

Data systems know when an item has left one process or entered another, but RFID can capture what happened in between.

the ceiling, waiting to be addressed. Everyone has exception handling processes, but when everything is an exception, that’s a problem.”

Within a pallet of mixed goods, for instance, RFID can quickly locate the mis-pick or stock-out. Tom O’Boyle, director of RFID for Barcoding, offers the example of one customer whose receiving process was significantly improved by RFID. “Now they scan for the three things that aren’t

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here as opposed to counting everything that is here," he says. "They now have more accurate data in a fraction of the time." For added convenience, a sort of "Geiger counter" function can even point a worker to, say, the top left area of a container for the target item.

**The last few inches**

Whether between two points in a facility or between Shanghai and Los Angeles, RFID can prevent products and assets from getting lost along the way. In the process, it can create visibility from dock door to doorstep, according to Kurt Mensch, RFID principal product manager for Intermec by Honeywell. "Many are familiar with the concept of the last mile and how best to deliver products and collect data along that mile," says Mensch. "RFID can serve as a 'last few inches' technology."

Using RFID to ensure the shelves inside a retail store always have all possible sizes can create a significant impact in warehouse and DC operations, says Fein, even if RFID is not used in the facility. Lots of execution functions react to that store-level RFID data, including seasonal preparedness, reverse logistics, merchandising or the establishment of regionalized inventory.

"If retailers are changing order patterns with RFID, which they should if they're using it properly, it affects manufacturing cycles and how warehouses are organized," Melling adds. "It informs what everyone wants and benefits everyone indirectly, although in the future it will start to benefit them more directly."

What all of these examples illustrate is that while the Internet of Things may not be as much a part of the discussion today as it was in the past, RFID is gaining traction in the supply chain. It’s just not being used to track pallets and cartons as initially envisioned. The biggest challenge to the adoption of RFID moving forward could be the reluctance of many users to talk about the value they are realizing from the technology.

"In the past four years, RFID use cases have centered on customer-facing processes in both retail and industrial markets," says OATSystems’s Doyle. “But I think it’s interesting that aerospace and defense firms are talking about their successes with RFID while many retailers are much more secretive about the competitive advantages they’ve gained.”

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Flexible warehouse management system mirrors company’s legacy system interface to ease transition for 200 employees.

Sheetz, one of the fastest-growing, family-owned convenience stores in the world, operates more than 470 locations across six states in the Mid-Atlantic region and employs 15,000 people. After outgrowing its legacy warehouse management system (WMS), the company implemented a configurable WMS capable of flexible growth.

The company has a single campus with two shipping facilities: a distribution center that handles the company’s full product line and a commissary in which fresh goods are baked and prepared. Products from the DC are shipped out three times per week, while items from the commissary leave seven days per week.

The company had outgrown its legacy WMS, which was no longer supported by its supplier. The company implemented a smaller WMS, but the resulting operational performance fell short. Ideally, the new system would use existing hardware, require minimal training for the 200 DC employees and serve shipping, warehousing and manufacturing needs. Sheetz worked with a supply chain and logistics consulting firm (St. Onge, stonge.com) to help with the search process.

After a search and selection process that included a trial period in which finalists processed real data from the company, Sheetz chose a WMS (HighJump, highjump.com) that provides a direct-ed, optimized workflow for receiving, put-away/flow-through, inventory management, replenishment and more. Built on an open architecture, the solution is highly adaptable.

“We based our choice on its ability to configure to our needs and react to our changing processes. This was very important to us,” says Eric Foose, software services manager. “This was the only solution that actually showed us how we could do it ourselves. Our IT team couldn’t believe it.”

The team configured the system to reflect aspects of the previous WMS, saving significant training time and cost. Foose notes improved efficiency and accuracy, including an increase in pick rates, a more streamlined process to return excess ingredients to inventory and fewer steps in the production receiving process. The company now has an improved process for end-of-day inventory adjustments, the ability to assign ingredients to a specific day production batch, and improved visibility into transaction history.

Sheetz is constructing a campus in Burlington, N.C., that will include a DC and commissary to serve area stores in 2014. The company is planning to configure the new location as part of its existing centralized WMS deployment and will be executing the rollout with its own in-house team. □
Lennox International is a manufacturer of high-efficiency HVAC systems for commercial and residential customers. After evaluating its supply chain, the company adopted a software platform (Manhattan Associates, manh.com) that provides end-to-end supply chain commerce integration.

Since Lennox owns all of its distribution, it is a manufacturer as well as a national distributor. Lennox implemented an enterprise resource planning (ERP) system but still needed a distribution system to support strategic changes. Lennox redesigned its supply chain to move from a national distribution network to a more regional distribution, hub-and-spoke network to support more than 6,000 dealers and 140 company-owned service centers.

“We needed an integrated system that would work with the transportation system, warehouse management system and labor management. This new system drives our processes to be more disciplined and that, in turn, improves our accuracy,” says Keith Nash, vice president of supply chain logistics. “Because of the redesign, our quality is higher, our costs are lower and our customer cycle time is definitely lower.”

Nash says the software dissolves operational silos, breaks down the walls between channels and promotes holistic and strategic decision-making. In the three years since the redesign, the company has seen a more than 50% increase in productivity, an improvement in shipping accuracy from 98% to 99.97% and an increase in inventory accuracy from 97.5% to 99.53%.

Nash says the company is moving into using the supplier’s supply chain event management system, which will give customers visibility to milestone events including the exact arrival time of the product.
Business software improves visibility, productivity and customer experience

Automotive aftermarket distributor optimizes supply chain with improved warehouse, inventory and customer management.

Mighty Distributing Systems of America serves the international automotive aftermarket, employing 90 people in a facility that supplies its independent franchises in 46 states. Those franchises then serve more than 25,000 repair facilities, resulting in an order volume of about 43,000 items on any given day. After upgrading its supply chain management software (IBS, ibs.net), the company was better able to handle distribution and inventory management amid the high volume.

Before the new software, the company had no real-time visibility into transactions, resulting in inadequate measurements for business performance. The leadership team identified a need for RF control in the warehouse, where order-picking productivity was in need of improvement. In addition, it was taking Mighty five days to close end-of-month financials, a costly and unacceptable situation.

With the new software, most of the daily intake of 5,000 order lines are received electronically and do not require review by customer service staff. Orders go to the distribution center for disbursement to the pickers who, within seconds, see the order information on the RF device. Inventory levels and replenishment are managed by demand to ensure maximum inventory turns at the installer level. As an added customer benefit, customers receive automatic acknowledgment notifications when orders are submitted and are able to see details of the expected arrival time.

“Nobody ever needs to look at a piece of paper,” says Keith Wilson, operations manager for Mighty Auto Parts. “The software has helped us achieve an order picking error rate of less than 1%, picking productivity is up 10% and it now takes us less than a day to close our books for the month.”

Along with optimized order fulfillment activities, Mighty also sees a much better picture of its financial performance. For instance, the software automatically produces reports on order activity, margins, returns and recovery costs, as well as the balance sheet. “It has helped us get to new regions, too, like Canada, Puerto Rico and the Middle East,” Wilson says. “It gives us better visibility and long-range planning capabilities. We can now manage customers with long lead times because we have reliable forecasts in our system.”

The company anticipates a 2.5-year return on investment.
AGV-powered custom carousel sequences parts in a smaller footprint

Moving assembly lines increase automotive supplier’s productivity while enhancing product protection.

Modular Automotive Systems, a division of Hollingsworth Logistics Group, provides front and rear fascia assemblies in sequence for an automotive OEM on a just-in-time basis. After installing a series of customized carousels, the company was able to increase productivity with less floor space for less money than traditional alternatives.

The company’s assembly process began with fascia outer shells being placed on carts equipped with protective cradles. Carts were manually moved through production cells where associates employ handheld scanners. The final step was a quality control station before parts were loaded in proper sequence on mobile racks and delivered to OEM assembly plants. The process was labor intensive and also required a considerable amount of production floor space.

“We were familiar with carousel assembly systems, but we also knew this method could be cost prohibitive,” says Christian Cantrell, program manager and process engineer for MAS. “Before installing the new system, our initial target was to handle 50 fascias in 47 minutes and the first carousel was able to do it in 36 minutes. The best part is that each carousel cost about 15% of the total of just one traditional carousel unit.”

While working with a supplier (Creform, creform.com) to create a continuously moving assembly line, several ideas were considered. Proposals included a paper clip-shaped route and moving cart concept before the team settled on a circular carousel system. The system was installed and operational within eight weeks.

The new system features eight stations and provides each associate with a pie-shaped work zone that uses about 50% less floor space. Each cart has a custom-configured rack and rides on a circular rail that is bolted in position on the floor. The carousel is powered by a low-speed, bolt-on style automatic guided vehicle (AGV) unit attached under the lead cart. It travels at 0.05 mph, (1.5 meters/minute) and has a load capacity of 1,496 pounds (680 kg).

“It is virtually impossible for a fascia to get out of sequence since they are only handled when being placed on or removed from the cart,” says Cantrell. □
Occupying a rather mature corner of the supply chain software market, warehouse management systems (WMS) suppliers simply can’t afford to languish or rest on their laurels in today’s dynamic business environment.

Well aware of this situation, suppliers are working to stay ahead of the curve by integrating new functionalities and capabilities that were probably unheard of just 10 years ago. Two challenges that are garnering attention this year are the need for better support for omni-channel distribution operations as well as improved integration of WMS with warehouse control systems (WCS), the software traditionally used to manage automated materials handling equipment.

Over the next few pages we’ll explore how WMS is evolving to support these two trends and then take a closer look at how retailers, manufacturers and distributors continue to drive the evolution of the software.
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Driven largely by the boom in e-commerce, today’s warehouse managers are focused on delivering a seamless customer experience across numerous channels.

Whether they’re picking out goods on a mobile device, sitting down at a computer, standing in a brick-and-mortar store or reading a paper catalog, today’s consumers want to be able to buy, exchange, return and get support for a retailer’s products across all channels and without a single hassle.

Adding to the overall omni-channel fulfillment challenge is the fact that it isn’t limited to just the retail environment. Indeed, manufacturers and distributors are also using multiple channels to sell and deliver their wares to business partners and suppliers. And because shipping, return and exchange activity on all of those fronts are taking place in the warehouse and distribution center, the WMS is playing a vital role in ensuring a smooth omni-channel experience.

“At this point, everyone has latched onto the idea of omni-channel commerce,” says Dwight Klappich, research vice president for Gartner Research. “However, not everyone is equipped to handle it.”

According to Klappich, that’s because omni-channel goes beyond just managing inventory within the four walls of a distribution center and incorporates a broader picture of inventory at rest, in transit, in stores and throughout the supply chain.

“With omni-channel, stores ultimately become a fulfillment point,” says Klappich, “which means companies have to be able to accommodate a higher volume of returns that may have originated online, in the store or from any other channel.”

Klappich points to Manhattan as one supplier that has incorporated e-commerce, retail, distributed order management (DOM), supplier enablement, and warehouse management to help handle the omni-channel environment. HighJump Software has also made some interesting inroads in the WMS space, adds Klappich, particularly when it comes to the store fulfillment side of the grocery business.

Using HighJump’s WMS, for example, managers can set up their stores as “mini warehouses,” where workers walk around picking and packing orders for home delivery. “Those are just two best-of-breed WMS vendors that are doing well in the omni-channel space,” says Klappich.

Simon Ellis, practice director at IDC Manufacturing Insights, says that for WMS providers to completely service omni-channel environments, the former will have to add more piece-picking functionality to their menus. Right now, most manufacturers ship via truckload or LTL shipments—not parcel—by choice.

“Most manufacturers would prefer to sell cases or even pallets over individual units,” says Ellis, who expects software providers like JDA, Oracle and SAP to continue broadening their features and functionalities to accommodate the challenges of omni-channel warehousing and distribution.

“At this point, some WMS vendors allow for the management of individual products while others don’t,” he adds. “That will likely evolve over the next few years as omni-channel continues to grow.”

The WMS evolution goes beyond omni-channel to include supporting a higher degree of automation and complex fulfillment strategies that, incidentally, also do their part in supporting the omni-channel environment.

Klappich says that there has been a slow progression of WMS suppliers moving into the WCS space over the last few years, with companies like Oracle and SAP integrating materials handling interfaces into their solutions.

The WCS/WMS connection is fairly new, says Klappich, and a far cry from the days when WMS as a business process application relied heavily on human involvement. “The mass majority of WMS solutions were designed for people-driven processes—from driving forklifts around to moving pallets to picking orders,” he says. “As WMS and WCS functionality has improved, companies have started looking harder at how to better manage their workforces and run more effective, more automated warehouses.”

The fact that materials handling automation has become more affordable is also pushing more companies to integrate the technology into their warehouses and DCs. In the past, Klappich says building out a highly automated facility could run upward of $20 million and require at least a
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“The setup was extremely rigid, with any notable changes to the automated facility being very expensive and time consuming,” says Klappich. Today, he says materials handling automation suppliers are creating more flexible environments and developing systems that can be more easily adapted and reconfigured.

Interest in WCS is also being driven by the current crop of what Klappich refers to as “Frankenwarehouses,” huge, older facilities filled with expensive equipment born from mergers and acquisitions that companies suddenly found themselves owning.

“As more automation was added to these facilities, they became hodgepodge of fragmented systems,” says Klappich. “Now, their owners are looking to create more streamlined environments and are showing an increasing interest in WCS to help them attain those goals.”

With SAP and Oracle driving the charge on the large vendor side, and Ehrhardt + Partner on the best-of-breed side, the blending of WMS with warehouse automation and WCS is expected to gain steam in 2014.

“We’ve been joking about the use of robotics and other innovations in the warehouse, but now we’re there, it’s happening,” says Klappich. “In fact, we’re already seeing some companies replacing tasks that warehouse workers handled manually with highly automated systems.”

Because U.S. companies tend to use fairly unsophisticated materials handling systems, Ellis is bearish on just how far the WCS/WMS alliance will grow. In Europe, on the other hand, he says the potential for such integration is much higher.

“The levels of automation you see in European DCs are typically much higher than they are here in the United States, although there are always exceptions to the rule,” Ellis says, noting that international overnight package and mail service providers work in a decidedly different environment. “UPS and FedEx run massively complex sortation systems in their warehouses and distribution centers, so WCS would be a crucial part of their operations.”

Other key WMS drivers

As WMS vendors continue to hone their offerings to meet the growing omni-channel and WCS trends, most are also keeping a close eye on several other changes taking place within the warehousing arena.

For starters, Bob Hood, senior manager of supply chain for consulting firm Capgemini, says that the number of operations that are upgrading their WMS (versus installing new or continuing to use aging systems) is on the rise. “There are a lot of firms out there sitting on WMS platforms whose support costs have become extraordinarily high—from both the physical hardware architecture and the maintenance perspectives,” says Hood.

“Over the last few years, an increasing number of companies have made the strategic decision to move away from those tailored applications and over to new releases,” says Hood, who sees most operations selecting upgrades from existing providers. “If a company is already a Manhattan shop, then it will likely upgrade Manhattan.”

Hood says that he’s also seeing more operations take an interest in WCS, but adds that simply layering such solutions on top of existing warehouse systems typically results in a “hybrid facility” that can be difficult to optimize across multiple channels. He expects WMS suppliers to continue honing in on organization’s needs and coming up with solutions that help solve key pain points.

“Warehouse and distribution managers want to be able to leverage common assets,” says Hood, “and encounter fewer barriers when it comes to supplying multiple channels using the same workforce and IT assets.”

In assessing the future of WMS, Klappich sees one more trend in the cards: a growing use of cloud computing as the delivery mechanism for these solutions.

And while cloud adoption in the WMS space remains fairly low, Klappich says that more managers are getting interested in the lower cost of ownership (at least at the outset), faster implementation times (a benefit that’s “often overstated by the vendors themselves,” Klappich notes), and 24/7 Web-based platforms served up in the cloud.

“For now, it’s still a fairly small percentage of companies that are moving in that direction within the WMS space as compared to other applications,” Klappich says. “However, there’s definitely a growing interest from warehouse and DC managers who want to be able to invest less and ramp up somewhat faster than they would with more traditional WMS options.”
New voice-directed mobile device, software released

For voice-directed picking, the new Talkman A720 mobile device enables the use of wired peripherals—such as headsets and long-range scanners—by including two TCO connectors. The unit uses the same infrastructure of batteries and chargers as other products in the Talkman family, including an extended-capacity battery that runs for 24 hours on a single charge. Its operation is directed by VoiceCatalyst software, which has been released in version 2.1. This release allows users of the supplier’s original VoiceClient software platform to run existing task-based workflows with no back-end changes, while enabling the software’s newest features. These include SoundSense speech recognition booster that blocks unwanted ambient noise, and TouchConnect for immediate touch-pairing of a worker’s wireless SRX2 headset to the device for fast start-up.


Scalable put wall for order consolidation, packing

Serving as an order consolidation and packing method for piece-picking operations, a put wall system brings high productivity, order accuracy, speed and efficiency to order fulfillment. Scalable and modular to accommodate changing requirements, the goods-to-person workstation is enabled by advanced algorithms within software that manages, directs and optimizes batch picking. Features include multiple workstations made up of a wall of shelving with individual compartments that hold one customer order each. Any number of separate order compartments in different sizes can be supported (30 to 75 is typical). For accuracy, each item is scanned prior to placement. Units can be mounted on wheels for relocation of the order consolidation process as daily requirements change. Dematic, 877-725-7500, www.dematic.com.

Cloud-based, voice-directed picking software

Allowing organizations of all sizes to migrate to a cloud-based voice management system is the Cloud Enterprise VMS voice management software suite. The cost-effective delivery option provides the same functionality as the supplier’s on-premise system with simplified deployment, management and installation. To ensure that users have the latest available technologies, all system updates are sent automatically. The voice-directed picking solution does not require a WMS for operation. To eliminate costs associated with server hardware, maintenance and personnel, it runs without requiring an existing IT infrastructure. Voxware, 877-483-7239, www.voxware.com.

Customize mobile computer with variety of modules as needs change

The highly customizable Workabout Pro 4 mobile computer supports a broad range of modules—including RFID readers, 1D or 2D bar code scanners, long-range scanners, and an 8-megapixel camera—that attach as needs evolve. Field-upgradable, the durable device has been engineered with an IP65 sealing that protects against jetting water and rain. It survives 6-foot drops to concrete and works in temperatures from -4°F to 122°F. It comes in two base models—a short version with numeric keypad, and a long version with an alphanumeric keypad.


Bar code scanner reads from short, long distances in freezer environments

The Granit 1280iFR scanner reads bar codes from short and long distances, improving worker productivity in ambient and cold storage environments. To boost efficiency, the scanner reads 100 mil retro-reflective labels from as far away as 54 feet, and 7.5 mil codes as close as 3.5 inches. It withstands more than 5,000 tumbles from 3.25 feet, and 50 drops to concrete from 6.5 feet. Engineered for continuous operation at temperatures of -22°F, it is equipped with an industrial cable that can survive more than 300,000 cable bends at a 90-degree angle in the same freezer temperatures. Honeywell Scanning & Mobility, 800-782-4263, www.honeywellaidc.com.
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**Multi-color, pick-to-light enables simultaneous picks in shared zones**

Using multi-colored bright flashing lights and easy-to-read LED displays, the RTS Trak3 cL pick-to-light system provides clear direction to pick locations and quantities for accurate picking. The multiple colors enable concurrent activity in shared zones, such as multiple active order fillers, or quick batch picks by color coding, to reduce walk times and improve productivity. Integrated with fulfillment execution software, the system scales up to meet increased capacity requirements. It works with existing WMS and ERP systems to provide advanced planning, management and reporting tools to optimize light-directed operations. Each module functions as either a single or dual location, with dedicated high-speed, device-level controllers. Constructed with a durable aluminum base for easy mounting to any type of shelving or racking, modules also include a cover plate for protection from dirt. Snap-in installation prevents devices from being dislodged when unloading or replenishing slots. Intelligrated, 866-936-7300, www.intelligrated.com.

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**Zoneless, box-to-picker order fulfillment system**

Driven by virtual data tag technology, the MPower Pick zoneless, scan-free, box-to-picker order fulfillment system is an alternative to manually powered medium-to fast-mover, direct-to-consumer order fulfillment processes. Fully automated, the system directs the travel of plastic totes or cardboard shipping containers atop a motor-driven roller powered conveyor. At the start of the line, a photo-eye sensor detects the empty order container or box, prompting a fixed scanner to scan the corresponding bar code automatically. All the information associated with each order is transmitted from one conveyor zone’s controller card to the next as the container moves from zone to zone. If there are picks in the associated inventory bay, the controller card illuminates a colored light on panel in each zone, and triggers corresponding pick-to-light modules in the bay. When the pick is complete, the system directs the conveyor to advance the order, passes along the updated pick data, and updates the master order database. IPTI, 262-567-6525, www.ipti.net.

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**Vertical lift module handles totes faster**

The EffiMat next generation vertical lift modules for small part storage offer a design that flexibly stores and retrieves industry-standard totes up to four times faster than a traditional VLM. The system’s elevator design allows automatic in-feed/out-feed through the side of the machine, providing a unique system for replenishing, buffering and transporting completed batches without operator intervention. In addition to the hardware design, the system incorporates intelligent inventory management and control software. SencorpWhite, 508-771-9400, www.sencorpwhite.com.
Automated storage systems offer photo-based inventory selection
To simplify picking from the supplier’s Shuttle vertical lift modules and Megamat RS vertical carousels, a new kiosk function has been added to the systems’ Power Pick Global inventory management software. The kiosk function inventories items in a photo catalog. A touch-screen PC mounted on (or near) the automated storage and retrieval system allows a worker to select the part required by photo instead of part number. For clear identification of the stored parts, the kiosk displays a photo, reducing picking errors. Kardex Remstar, 800-639-5805, www.kardexremstar.com.

Pocket sorter order fulfillment system
Ideal for multi-channel and e-commerce, the pocket sorter order fulfillment/sortation system enables a variety of goods (flat and hanging apparel, accessories, shoes, cosmetics, general merchandise and more) to be carried, buffered and sequenced together in one device. It accommodates anything that can go in a standard-sized shopping bag. The pocket connects to a track system with roller adapters to efficiently transport a variety of different sized articles. For continuous tracking, each pocket is equipped with an RFID tag. Useful in picking, order consolidation and packing operations, the flexible system is suspended from overhead, minimizing required space and making it easy to integrate into an existing facility. Knapp Logistics Automation, 888-606-0695, www.knapp.com.

Voice-guided picking solution understands 65+ languages
Datria voice software provides hands-free, easy-to-understand picking commands in more than 65 languages. Using speech recognition technology to facilitate fast, accurate communication between employees and enterprise systems, it functions without keyboards, screens or lights. The easy-to-use system enables rapid training and high user acceptance, and includes retail workflow and performance management tools. The open software leverages speech industry standards on existing IT infrastructure, and supports a range of wearable or handheld mobile devices to reduce hardware costs, ongoing maintenance and total cost of ownership. It can also be integrated with scanning, lights or other automatic data collection technologies. Because it is deployed with a cloud-based infrastructure, the system is scalable to accommodate the needs of small and large operations. Knighted, an Intelligrated company, 866-936-7300, www.knightedsoftware.com.

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The dual-sided LP Put Wall system uses light-directed picking modules for high-speed, automated batch sortation, making it ideal for e-commerce order fulfillment. The unit optimizes batch and wave picking, as well as high-speed, one- and two-line order sortation. Constructed as a series of shelves divided vertically into multiple openings, or that hold empty bins or totes, each space represents a unique customer order. Openings on the front and back are equipped with a light-directed picking module. Scanning a picked item’s bar code illuminates lights that indicate the put location and quantity of the item required to fill each order. Lightning Pick, 262-250-2100, www.lightningpick.com.

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Jerry Heathman

**TITLE:** Incoming president, Conveyor Equipment Manufacturers Association (CEMA); sales manager, Chantland Company

**EXPERIENCE:** 32 years in the conveyor industry and with the Chantland Company.

**DUTIES:** Heathman is the manager of sales and marketing for the Chantland Company. At CEMA, he chairs board meetings as well as sits on the strategic planning committee and participates with the ongoing work of other committees.

Modern: Jerry, congratulations on the new position. As you see it, what are the most important issues CEMA will address in the coming year?

Heathman: We’re coming out with the seventh edition of Belt Conveyor for Bulk Materials. That’s our hardcover engineering manual that is recognized around the globe as the bible for bulk handling. We’re also working on translating our books, manuals and standards into other languages. For instance, we’re partnering with ABNT, the Brazilian National Standards Organization, to translate the belt book into Portuguese. We also plan to move forward with Spanish translations of our literature. The world becomes a smaller place every day, and we want CEMA to be the go-to source for information.

Modern: How did the conveyor industry fare in 2013 and how is 2014 shaping up?

Heathman: In 2013, shipments were down by 2.6% following record years in 2011 and 2012. The overall decrease was entirely due to the bulk handling side of the industry. The unit handling side of the industry had a solid year. A lot of the decrease on the bulk side has to do with the switch from coal mining to natural gas. Looking forward, we’re expecting a 2% uptick in 2014. We feel good about growth.

Modern: At Modex 2014, there was a significant amount of interest in automation, including conveyor and sortation systems. From where you sit, what factors are driving the conveyor industry right now?

Heathman: E-commerce is changing the dynamics of materials handling. We’re all seeing tremendous growth in e-commerce. Logistically, you can’t pick, pack and ship the increasing volumes of orders without automation. That’s the game-changer today.

Modern: Looking forward, what issues will CEMA address in the coming years?

Heathman: I’d go back to the fact that the world is becoming a smaller place. Our industry needs to adapt to changing markets and the players within those new markets. We will always be the standards organization for the North American conveyor manufacturers, but we need to be aware of what’s happening in these other markets.

Modern: As you think of conveyor technology, what are the most important developments or innovations benefiting end users today?

Heathman: There are three main points. Speed is the first. It’s not just speed of the conveyor, but the speed at which a conveyor system is now commissioned. The industry has lead times, which allows a customer to get up and running faster. The software has been enhanced—that’s really changing the dynamics today. Lastly, conveyor and sortation equipment has evolved to handle an array of sizes, boxes and materials. That really benefits retailers.
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