



Mike Jacks, senior manager of logistics systems



# Coke's new. take on **VoIP**

To revitalize its distribution processes, Coca-Cola Refreshments U.S.A. implemented a VoIP-based voice technology that enables 3,000 warehouse associates in 100 facilities.

By Bob Trebilcock, Executive Editor

Everything about Coca-Cola Refreshments U.S.A. (CCR), the subsidiary that manufactures and distributes Coca-Cola products in North America, is big.

The company is the largest manufacturer and distribution point in the world for the largest soft drink producer in the world. CCR manages some 600 Coca-Cola brands and thousands of different beverages, producing 5.3 billion cases a year. It has some 65,000 employees working in 630 facilities around the country and makes more than 50,000 deliveries a day with a fleet of 30,000 vehicles.

And some 3,000 of those employees, working in 100 facilities that each handles more than 7.5 million cases a year, are directed by a voice over Internet protocol (VoIP) voice recognition system (Datria, [www.datria.com](http://www.datria.com)) when they are picking orders.

Yes, you read that correctly: One voice system is managing 3,000 employees working in 100 facilities. As large as that sounds, CCR is not done, and intends to enable more workers across

the enterprise and more tasks down the road. "Basically, anything you can do on a keyboard in our SAP enterprise resource planning (ERP) system can be done in voice, including picking and putaway, shipping, and directing our drivers and service techs in the field," says Rick Gross, director of supply chain development.

The results also include big numbers: "We are maintaining the 99.8% shipping accuracy that many of our large customers require, and we are 100% accurate in a number of our facilities," says Mike Jacks, CCR's senior manager of logistics systems. "We also estimate that we avoided \$2 million in capital expenditures because we were able to use off-the-shelf phones and headsets versus the cost of a mobile computer and headset associated with traditional voice."

To be sure, there are pros and cons to a VoIP solution and VoIP may not be right for every warehouse and distribution center. Steve Banker, an analyst with ARC Advisory Group ([www.arcweb.com](http://www.arcweb.com)), argues that the sheer size



CCR's voice system uses voice over IP phones.

and sophistication of CCR's operations made it a prime candidate to successfully deploy a VoIP approach. The fact that CCR had already made a decision to standardize its enterprise on VoIP technology prior to extending it to its distribution operations, for instance, was a key enabler. Banker believes most distribution centers may still be better suited to traditional voice.

Still, voice is an evolving space. As the price of the hardware and technologies associated with VoIP come down and the systems become more user friendly and

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An order selector begins by logging on to a VoIP phone.



The order selector is then directed by the phone to a picking location.



After orders are picked, the selector prints out labels at a kiosk.

easy to implement, it may give traditional voice—where industry leader Vocollect continues to gain market share—a run for its money. CCR, for instance, rolled out all 100 locations in just 18 months, including a two-month pilot.

Here's the story of how CCR settled on a VoIP solution and why this approach met its needs.

### Driven by accuracy

For more than 100 years, the Coca-Cola bottling system in North America relied on a manual pick operation. Most recently, order selectors swiped an identification card at a kiosk to receive a paper printout of their work assignments and then went about the job of filling orders from paper. Filling orders meant pulling full pallets from a storage location and delivering them to the shipping dock. In that type of environment, paper was up to the job.

But, full pallets are no longer CCR's operating environment. Over the last decade, every beverage producer has added more and more products and offered them in more and more packaging configurations. At the same time, retailers no longer want to receive and stock a full pallet of each product. They want mixed pallets with just enough of each product to satisfy demand in the short run. And, they increasingly

demand accuracy rates of up to 99.8%, as shippers pay dearly for order mistakes.

"As we started adding more packages to our warehouse, our order profile changed," says Jacks. "Now, 80% of our volume is mixed case pallet loads. Our warehouses could no longer accommodate the volume by doing things manually." What's more, in many locales, expanding those facilities was not an option even had CCR wanted to add distribution space. "We have prime locations in most major cities," says Jacks. "But in many locales, those facilities are landlocked."

Throughput, however, wasn't the only issue. With more complex order fulfillment requirements, it became more costly to maintain the accuracy rates required by CCR's biggest customers. "Our retail customers demand 99.8% accuracy on automated ship notice (ASN) shipments, and if your accuracy falls below 99.5%, you can't remain on the ASN program," says Gross. "To achieve our customers' accuracy targets, we had to put additional people in place to check orders. We are a Six Sigma company and that additional checking is a waste."

### Selecting voice

In 2007, CCR began to investigate different technologies that would improve

accuracy without sacrificing efficiency. "We targeted the largest 100 facilities," says Jacks. "Since there are a wide variety of facilities in terms of age, sophistication and layout, we needed a solution that was flexible enough to adapt to all of those different scenarios." After investigating voice, pick-to-light, RFID and bar code scanning, they agreed they wanted a solution that allowed for heads-up, hands-free operation by the order selectors. Voice made the most sense. "Bar code scanning delivered the accuracy we wanted, but it wasn't hands free," says Jacks. "RFID wasn't economical, and most of our facilities weren't set up to accommodate pick-to-light."

Voice, on the other hand, allowed order selectors to work hands free. What's more, says Gross, with the ubiquity of cell phones "voice is a natural form of communication today. People are used to talking on their cell phones and using headsets."

CCR's initial investigation of voice led it to the leading providers of traditional voice solutions for the warehouse as well as tours of a number of food warehouses using traditional voice solutions. Jacks and Gross initially assumed that's the direction they would take. At the same time, CCR had made a corporate commitment to a VoIP infrastructure for its business. Once the voice

team began talking to SAP, Cisco and Avaya, CCR's strategic partners for its voice infrastructure, they decided to create their own solution. "We found there were a lot of similarities in the way that voice providers deployed their solution," says Jacks. "We have a sophisticated IT staff and felt we could leverage our infrastructure and come up with something ourselves."

In the spring of 2007, the group was in the process of evaluating vendors for the different components they would need when several members attended SAP's annual user conference in Orlando. During a meeting with SAP, they learned about Datria's VoIP voice solution. That was followed by a trip to Denver and a challenge to the voice provider to develop a server-based solution that would integrate with SAP, deliver instructions to workers within CCR's workflow structure, use off-the-shelf hardware and leverage CCR's existing VoIP infrastructure. Six weeks later, Datria came up with an application.

### **Going live with voice**

The primary difference between CCR's solution and a traditional voice solution is in where the voice application resides (for a more detailed explanation, see p. 22). In a traditional voice application, an instance of the software resides on every operator's mobile computer, which is typically worn on a belt. In a VoIP solution, one instance of the software is loaded onto a central server. Instead of a mobile computer, a mobile worker dials into the solution with a VoIP handset—in essence, an industrialized cell phone.

Where many voice solutions use proprietary mobile computing devices and headsets, a VoIP solution works with off-the-shelf handsets. These are considerably less expensive than traditional voice hardware. There is, however, a tradeoff. A company may need to build out a WiFi infrastructure to accommodate the VoIP solution. Indeed, CCR realized it would have to provide additional access points in each facility to work with the new system. However, since CCR had already committed to VoIP on a corporate-wide basis, most of the infrastruc-

ture was already in place and paid for. In this instance, the distribution operations could leverage an investment the corporation had already made.

Remember those big numbers we talked about in the introduction? Despite the quick turnaround by Datria, CCR wanted to prove the solution before committing to an approach that had not been done on this scale in the past.

The bottler launched two 60-day pilots to pit VoIP against traditional voice: a pilot in Jacksonville, Fla., got underway on June 15, 2007, while a competing pilot began on July 15 in Ft. Worth, Texas. In August, halfway through the second pilot, CCR had enough data to commit to VoIP.

Over the next month, CCR identified 23 sites for the initial roll out in addition to Ft. Worth and Jacksonville and organized four deployment teams. The actual deployments got underway in September and by the end of December, 25 sites were up and running.

By the end of 2008, the voice system was up and running in an additional 75 facilities, bringing the total to 100.

"We went from zero to 3,000 employees using the voice system in just 18 months," says Jacks.

### **Lessons learned**

As with any early adopter of a technology, there have been lessons learned.

One is that the system is very much speech independent. In a traditional voice implementation, a process known as speech dependent, each user records a sample of his voice. In a speech independent implementation, those voice samples are unnecessary.

Yet, CCR says that its system will pick up just about anyone's voice. "We had a person on our team who spoke English with a heavy French accent," says Jacks. "I dialed in, did some pallet picks and then handed the phone to that person. He was able to pick up where I left off." Not having to record speech samples for 3,000 separate employees sped up the implementation process.

At the same time, some experimentation was involved in getting a phone suitable for an industrial setting. For instance, CCR initially was getting just

four to five hours out of a battery; through some adjustments, the team figured out workarounds to get 12 hours between charges. By then, Jacks says, Cisco came out with an extended life battery that is good for 16 hours.

Initially, CCR had to have individual battery chargers for each phone that was going to be charged. Since then, Cisco has developed a six-port charger that will hold two batteries per port, or 12 batteries at a time.

Likewise, the initial off-the-shelf phones were designed for call centers and not a rugged industrial setting. CCR workers regularly wore out the jacks on the phone. Today, after working with Cisco engineers, CCR is using a Bluetooth-enabled, ruggedized phone with a battery-powered Bluetooth headset that is doing the job.

As to the \$2 million in hardware savings, Jacks and Gross agree that the installation required more access points to get the density of coverage required than would be required in a typical RF warehouse using bar code scanning. Those additional costs, however, were more than offset by the savings on hardware. That's where the scale of the CCR implementation comes in to play. "To enable 3,000 workers across multiple shifts, we purchased 3,000 handheld devices," says Gross. "The savings across that many units was substantial."

Now that picking operations have been enabled, CCR is developing a strategic roadmap for extending voice to other processes in its distribution and logistics operations. Route delivery is a possibility. Field service is another. There are other transactions in the SAP warehouse management system that might also be enabled by voice. "Because we have this architecture in place, if we have a solution that is going to drive a significant ROI, we can make a recommendation and accelerate the adoption," says Gross.

And while VoIP may not be right for everyone, it has delivered for CCR. "All of the benefits we anticipated, from a savings on the hardware to improved accuracy and efficiency, we're realizing," says Jacks. □

## How VoIP works at Coca-Cola

The system uses wide area and local area networks to direct operations on the floor of warehouses across the enterprise.

Several different components at the corporate and facility level come together to enable the VoIP voice recognition solution at Coca-Cola Refreshments U.S.A. (CCR).

The voice application (Datria, [www.datria.com](http://www.datria.com)) is hosted on a bank of servers (1) at the company's corporate data center in Atlanta. That site also houses the company's enterprise resource planning (ERP) software system (2) and the private branch exchange (3), or PBX, which is the telephone exchange that serves Coca-Cola's internal telephones and connects to an external public network.

A second server (4) located in each of the 100 facilities using the voice system hosts the speech recognition text-to-speech application. This is the application that translates a VoiceXML page created by the voice application into voice instructions for workers. Each facility also has a router (5) that acts as a browser for the VoiceXML pages. Finally, communication takes place within both the corporate data center and the facilities over the wireless local area network (LAN) (6). Communication between the corporate data center and the facilities takes place over a corporate wide area network (WAN) (7).

That's the basic voice infrastructure. Here's how the components all come together to fulfill orders.

In the corporate data center, orders are passed back and forth between the ERP system and the voice application to create an order in a VoiceXML page format. The VoiceXML pages are routed by the PBX system from the LAN at the

### Coca-Cola Refreshments U.S.A. Atlanta, Ga.

**BRANDS:** CCR bottles more than 600 brands

**SKUs:** more than 2,000

**THROUGHPUT:** 5.3 billion cases per year

**LOCATIONS:** 630 facilities in North America—voice has been implemented at 100 of the 350 facilities handling more than 7.5 million cases per year

**EMPLOYEES:** 65,000 with 3,000 using the voice system

data center to the WAN and then to the LAN at the appropriate facilities to fill the orders. Once they are received at the facility, they are routed over the wireless LAN to the speech technologies server, where they are turned into voice instructions.

Prior to voice, an order selector would log into a kiosk in the warehouse by swiping a card. The system would then print out a paper pick list. Today, the order selector begins the shift by selecting a VoIP telephone and headset (8). Each phone has an IP address. When the worker logs on, a telephone connection is established with the local server. He will also use the speed dial function to choose to receive instructions in English, Spanish or French. At that point, he will be asked by the system for his ID. Based on the order selector's profile, the system will give the order selector the next order to be picked. From the time the selector dials into the system, he will be connected in one continuous call unless he goes on break, goes to lunch or clocks out.

The selector is then directed by voice to a slot location for picking (9). The selectors use man aboard pallet jacks and pick to a pallet. Once the selector arrives at a location, he is asked to speak the slot number and a check digit into the headset; when the digit is confirmed, the system tells him what quantity and what product should be picked.

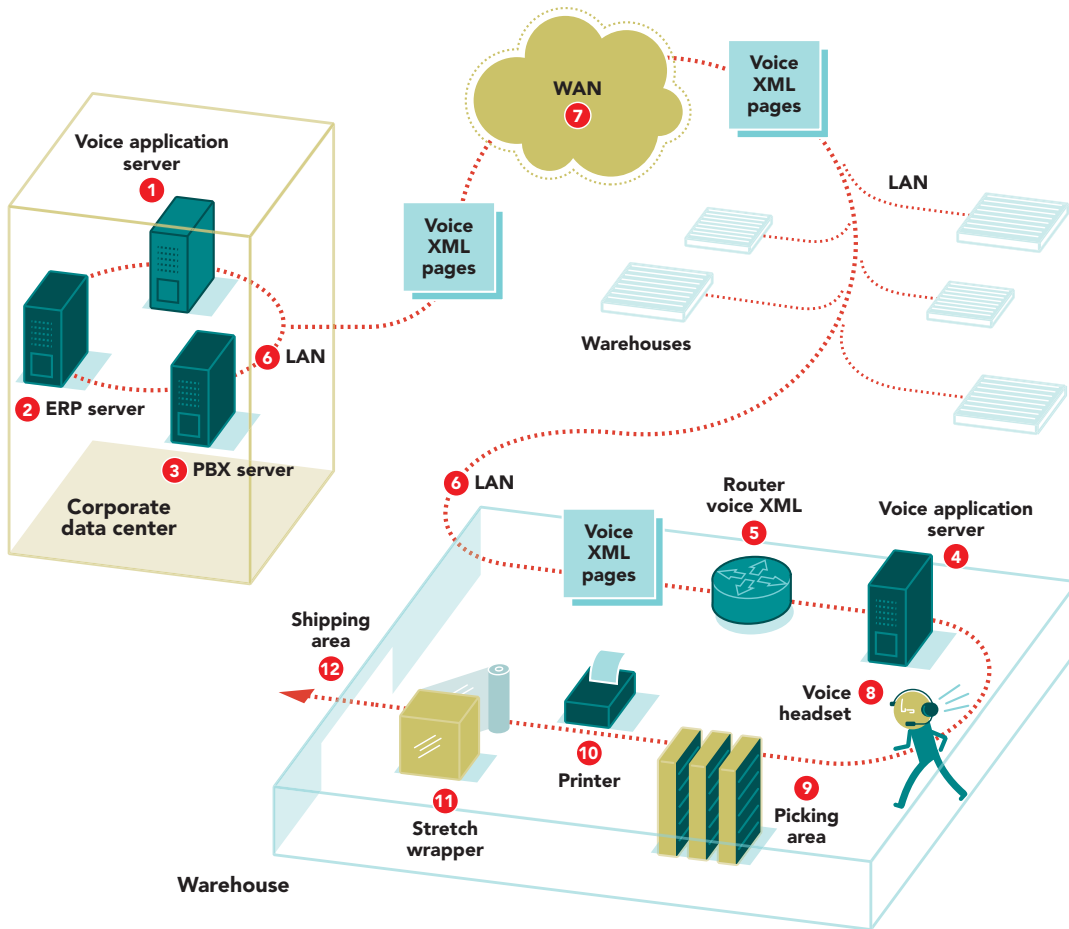
### System suppliers

**Voice recognition technology:** Datria, [www.datria.com](http://www.datria.com)

**ERP:** SAP, [www.sap.com](http://www.sap.com)

**Voice mobile devices:** Cisco, [www.cisco.com](http://www.cisco.com)

**Electric pallet jacks:** Cat Lift Trucks, [www.cat-lift.com](http://www.cat-lift.com)



At the last pick for an order, the system will prompt the selector to go to a printer (10), where he will get a pallet ticket or a pallet label. The selector

speaks the last three digits of the pallet ID number to confirm that he has the correct label. After confirmation, he will stretchwrap (11) and stage

the pallet for delivery (12). Once the order selector completes and verifies the pick, the system repeats the process until the order is complete. □

the pallet for delivery (12).

If the order selector wants to ask a specific question, he will be presented with a menu of options. If there is no material available for picking at a slot location, for instance, the order selector can short the order by speaking a reason code. If a selector is uncertain about the product to be picked, he can ask for a product description—CCR has recorded a wave file for each brand and each product. In addition, a selector can ask the system for the largest quantity to be picked first to build the most stable pallet.

## VoIP or traditional voice: Which solution is better?

Datria argues that because its solution uses off-the-shelf phones that cost considerably less than traditional voice hardware and operates over a WiFi network, it is a less expensive solution.

Steve Banker, director, supply chain management, for ARC Advisory Group ([www.arcweb.com](http://www.arcweb.com)), is impressed by Coke's implementation, but is not sure that VoIP is right for everyone.

"There were some unique characteristics to the Coke implementation," Banker says. The most important of those was that Coke had made a commitment to use voice corporate wide and not just in the

DC. In addition, he says, Coke had an experienced IT staff. While the bottler did have to beef up their WiFi infrastructure and add a number of access points, Banker says that it made sense for Coke.

"If you're standardizing on voice across your company, there's a very good argument for this approach, especially if you have an experienced IT staff," Banker says. "At the same time, I'm not sure it makes sense for the warehouse that doesn't have an infrastructure in place and wants to implement a simple and reliable solution." Or, if a company has just one or two

facilities, remember that CCR has been able to leverage its investment across 100 facilities to date.

That said, Banker points out that the traditional market is more dynamic than ever. "Despite new players and more competition, I believe Vocollect is stronger than ever, as is Lucas Systems," Banker says. "At the same time, we're seeing solutions like the one from Aldata in France that uses a Nuance speech engine and doesn't lock you into using proprietary hardware."

In short, for the company implementing voice, there are more choices and solutions than ever before.