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speech recognition systems.

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## The Little Speech Rec Engine that Could

**Union Pacific gets empty railcars back to work fast, with a speaker-verification system that hastens their "release" after unloading.**

By Ellen Muraskin

06/05/2002, 7:25 AM ET

### The premises:

Union Pacific Railroad, St. Louis

### The pieces:

- 1 SpeechWorks speech rec and SpeechSecure verification
- 1 Intel voice server with twelve ports
- 1 Legacy Mainframe apps
- 1 Intel/Parity's CallSuite programming objects
- 1 Microsoft Visual Basic

### The plot:

Union Pacific Railroad, St. Louis, MO, is the largest freight railroad operator in North America, operating 310,000 cars across the western two-thirds of the U.S. It's a 120-year-old business that sends and picks up railcars to and from the sidings of huge customers like Dow Chemical and General Motors, and its EDI links to these customers are as well established as its rail system, dating back at least to the early seventies. UP's method of releasing and tracking its empty railcars, however, has recently profited from rapid adoption of late-model speech and web technology.

When freight rail customers finish unloading a shipment on a siding near one of their plants or other facilities, they inform Union Pacific that car number xyz123 is available for release. UP

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then automatically schedules an engine and takes that car out of the plant or industry yard. Traditionally, this order has been entered over the phone to an agent or automatically, via mainframe-to-mainframe EDI link. According to Charles Duckworth, UP's senior director, e-commerce, "We're 92% e-commerce with our bills of lading, EDI standard form 404. Of that 92%, 80% is mainframe-to-mainframe." (Yes, he knows XML is around the bend. But in his industry, it has yet to build up a head of steam big enough to start converting.)

For the past two-and-a-half years, registered customers have also had a website option; data entered this way has been scraped off the screen and converted into EDI format for the mainframe. Automatic emails or faxes have been sent back to confirm receipt of release order; 40,000 railcars were released this way in March 2002.

Duckworth wanted to extend this functionality to customer employees standing on the shipping dock with cell phones. "To automate this process," he says, "our IT shop and SpeechWorks developed an app to mimic what we do on the web. We give them a user ID the same one they can use on the web, which we check against a table when they call. We register users with three voiceprints, and get a match to be sure we know who's calling. If we get a hit, she he refers to the app as "she," because she has SpeechWorks' friendly, can-do female voice asks him how many cars he wants to release, and what their numbers are. Then she validates that the car numbers given are good, and that the account is listed as either shipper or receiver of that car. We have several levels of security built in, so that people can't maliciously release cars." Speaker verification is a module, SpeechSecure, relicensed by SpeechWorks (Boston, MA - 617-428-4444, <http://www.speechworks.com>) from T-Netix.

The railcar-release application was written in Visual Basic, using Intel/Parity (Parsippany, NJ - 973-993-3030, [www.dialogic.com/products/parity](http://www.dialogic.com/products/parity)) CallSuite objects, accessing recognition functions from SpeechWorks, and feeding into the web application's business logic. The web application, in turn, inserts the recognized car numbers into EDI format (message number

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423, car release) for the mainframe's preexisting business app and database, parts of whose code can be traced back to late-sixties, pre-CICS transaction processing.

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Adoption has outpaced expectations. Last August, the first month of deployment, 85 customers used the system to release 400 cars. This March, 910 users released 6,000 cars, automating 30% of these routine calls, which make up about 20% of all calls into the center. Duckworth shares credit for this good uptake with SpeechWorks' "market accelerator program." It's part pre-packaged, customizable internal marketing materials, and part professional service, in which SpeechWorks sat down with him to get a sense of user demographics and customization needs. "I actually borrowed some stuff and developed internal brochures. Our sales reps gave away some. We've been doing e-commerce for a while and we know how to attract people, but they did help with their marketing package."

SpeechWorks also helped develop the app and tune it to a wide demographic range. "Our railroad goes from the West Coast to the Mississippi, and we get English inflections from New York to West Texas. Very few customers have had problems with the speech recognition." The speech company also spent a half-day doing post-audit, says Duckworth. One result: they went from a one-voiceprint registration to three; the system has to match on at least one. "If you're in the middle of recording your voice and you sneeze in the middle, you have to do that every time after to get a match," Duckworth points out. Also, "If people think they're talking to a computer, they tend to talk like a computer." When they later get accustomed to the system and speak in a more natural tone, they may not match their print, he says.

UP was also able to improve recognition accuracy by cutting down the database of railcars in the recognition grammar to only those cars that had moved on UP's rails in the last 16 months. That eliminated a lot of similar-sounding railcar codes (some started with CMW, some CNW) and cut the size of the file by 80%, without eliminating any possible hits. The application resides in-house on an Intel-equipped server; it uses twelve ports.

The day of our interview they were launching a second speech-enabled app with voice verification. This one works for "intermodal" traffic: Containers, usually holding high-ticket items like consumer electronics, which may move from rail to tractor-trailer for ultimate delivery. Here, the shipping order contains a "pick-up" number password that drivers must tell railroad staff in order to load the freight onto their trucks. With the new app, the driver picking up has to tell this pickup number to the SpeechWorks application over the phone, an app made possible through the wide proliferation of cell phones. "People can share user IDs and passwords, but they can't share voiceprints," Duckworth points out. This app gives added assurance that whoever takes the container onto a truck is the properly assigned driver.

Paul McGee, senior manager of IS at UP, says that SpeechWorks was chosen for the project for its ability to take on responsibility for the

entire first application, and work with tools UP was already using. "Their professional services group submitted a proposal to handle the design, development, and assist UP with the integration into our environment and with our applications. The other vendor who replied to the RFP wanted UP to work through a third-party developer and integrator who had their own set of development tools. We thought this was a riskier path and would have introduced more new technology to the project. One of our objectives during the development process was knowledge transfer. This has been successful, as we have implemented the second application on our own."



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