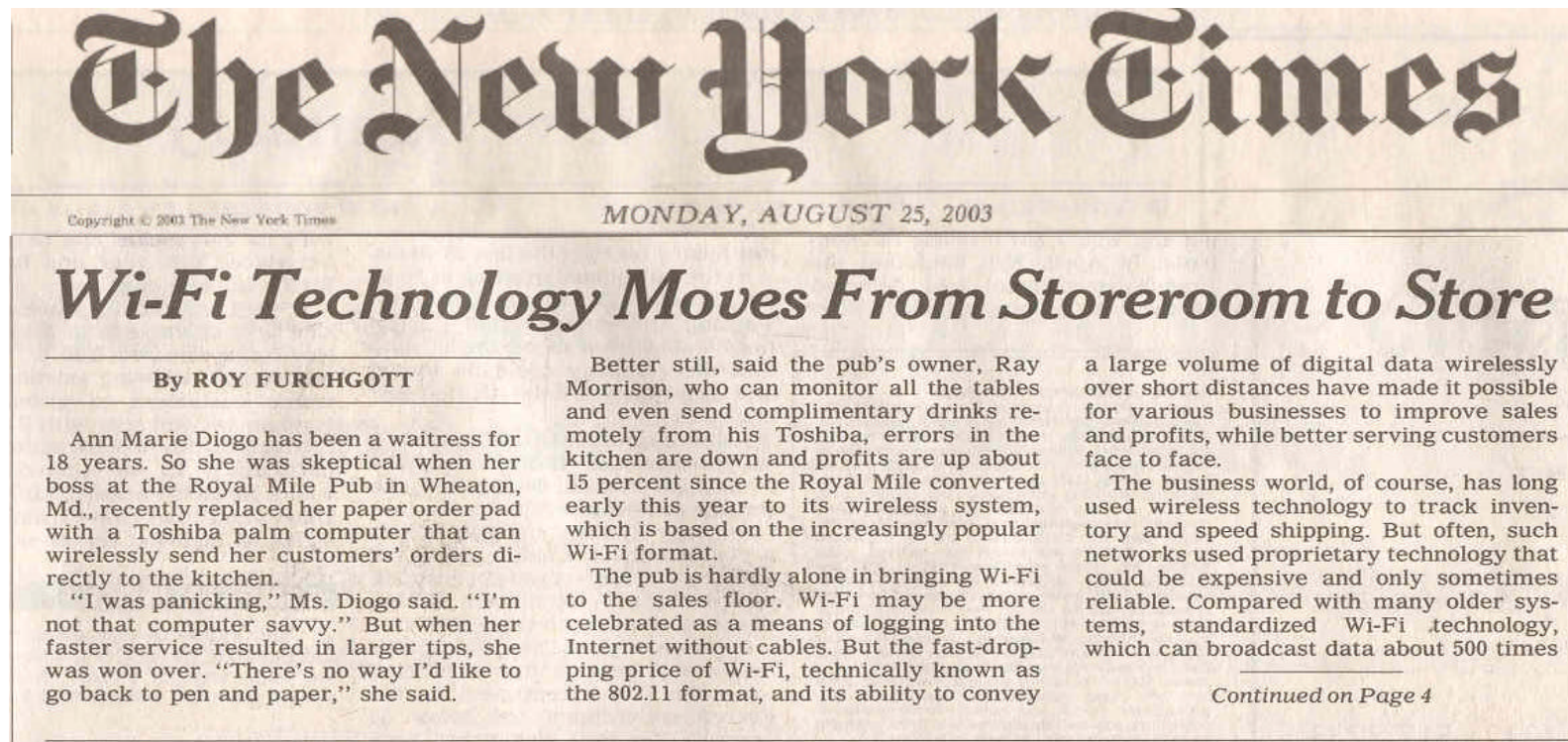


Article highlights ASI's Write-On Handheld™ installation in the Royal Mile Pub, Wheaton, MD, and was seen on the front page of the [New York Times](#) Business Section, August 25, 2003.



Wi-Fi Technology Goes From Storeroom to Store

Continued From First Business Page

faster than a cellphone, is exceedingly stable, if only because as it becomes more common, feedback from its many users has led to continual improvements.

And the high volume of production, driven by popular demand, has pushed the price down to less than \$100 for the local network routers at the heart of the systems and less than \$100 for the wireless circuit card that connects a device, like a palm or laptop computer, to the network.

"Last year under 20 percent of the laptops had Wi-Fi built in; this year it's 40 percent," said Brian Grimm, a spokesman for the Wi-Fi Alliance, a trade association.

Operators of stadiums, casinos, groceries, hospitals and department stores are among those who have recognized the value of bringing wireless technology out of the storeroom and into the store.

Stop & Shop, the 336-store grocery chain based in Boston, had used specialized wireless hand-held devices to track inventory for more than a decade. But in April the company put an 802.11 network in shoppers' carts through a portable device called the Shopping Buddy. The device lets customers perform feats like order a pound of pastrami from the deli counter while wheeling through the canned-goods aisle, and then alerts them when the order is ready.

Shopping Buddy also has a location device to guide customers to hard-to-find items, and a bar code scanner that keeps tabs on purchases for

As the cost of wireless technology falls, more businesses are using it to improve sales and profits.

budgeting and to let shoppers zoom through a self-checkout lane. Using a Shopping Buddy involves running the customer's Stop & Shop loyalty card through the built-in magnetic stripe reader.

"It knows who you are. It knows what you buy when you are usually there," said Mira Genser, a spokeswoman for Cuesol of Quincy, Mass., which designed the Shopping Buddy's software.

Nordstrom, an avatar of customer service, is installing a wireless network and stationary terminals that can replace the sales staff's "personal books," notepads that sales associates use to write down personal information about regular customers, like clothing sizes and favorite brands. "If there is a Donna Karan trunk show, we can suggest the top 10 clients for the sales associate to call," said Al Falcione, the senior product marketing manager for Blue Martini Software, which designed the Nordstrom system. Although Nordstrom is not initially giving its staff hand-held devices that are tied to the sys-

tem, the system can accommodate them, Mr. Falcione said. The devices would allow the staff to locate an orange polo shirt in size XXL in any Nordstrom store, right from the sales floor.

The casino and hotel operator Harrah's Entertainment of Las Vegas has tested several uses of Wi-Fi at its properties. Curbside check-in lets high rollers bypass the hotel registration desk and shortens lines for all guests. The hand-held terminal can also direct a host to dole out perks on the spot, checking information on specific guests to see if their past business warrants a free meal or show or even a free room, said Tim Stanley, Harrah's chief information officer.

Harrah's has also experimented with using roving cashiers, who tote hand-held terminals to verify player winnings and make payments on the casino floor, so the customers can keep gambling when they would otherwise be standing in line at the payout window. A small portable printer even spits out federal tax forms at table-side. "It keeps them in the action longer, frankly," Mr. Stanley said.

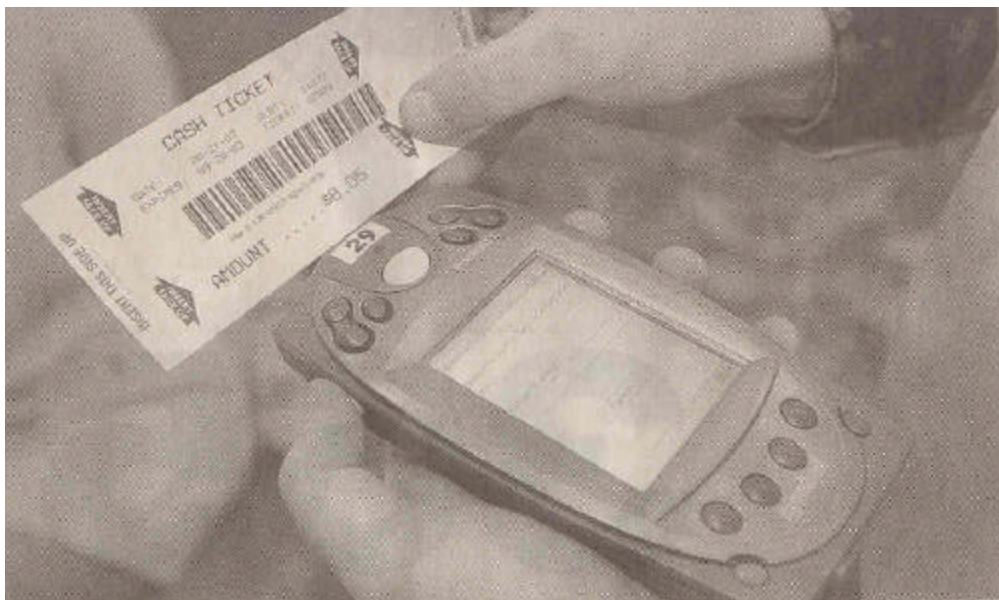
Does Harrah's worry about hackers trying to invade the wireless payout system? The company is exceedingly security minded, Mr. Stanley said, and Wi-Fi is "as rock solid as anything wireless can be."

Like any radio signal, though, 802.11 is prone to disruption. That is a particular concern in steel and concrete structures like stadiums, said Ron Mandel, a technology director for Aramark, a Philadelphia company that specializes in managing concessions at sporting and entertainment events, among other areas.

Aramark has installed Wi-Fi food-ordering systems in nine professional stadiums, so that waiters at the premium seats in Oriole Park at Camden Yards in Baltimore, for example, can process an order for nachos without leaving the section.

A sellout game can be a challenge, because among other considerations Wi-Fi waves have difficulty traveling through water.

"Humans are made of liquid, so when you put enough people in the seats, communications can deteriorate," Mr. Mandel said. "There's



Photographs by Dave Gately for The New York Times



At Harrah's Rincon Casino and Resort in San Diego roving cashiers with hand-held terminals, above, verify player winnings and make payments so customers can spend their time gambling rather than standing in line at the payout window.

Wireless technology is faster, cheaper and, in many cases, more stable than older systems.

nothing like a full house to fully see how good your communication really is."

In efficiency and customer relations, restaurants may have the most to gain from Wi-Fi. Wireless hand-held devices save waiters trips to the kitchen, allowing more time with customers. Errors are reduced because the printed order tickets received in the kitchen are easier to read than the average waiter's scrawl.

Burgermaster, a family-owned chain in Bellevue, Wash., that includes two drive-in restaurants where carhops still hang trays with burgers, shakes and fries on the driver's-side windows, installed its first wireless ordering system 15 years ago, using proprietary technology.

"The manager wanted to try it, and we actually gave him a pretty hard time about it," said Bob Jensen, a Burgermaster vice president and son of the founder. But that system sped up customer turnover so much that sales increased to \$1,200 an hour, from \$800, on the first day of use.

Recently, Burgermaster replaced its system with a Wi-Fi setup. The new system, which uses hand-held Compaq iPAQ PC's, cost \$55,000, less than half the amount of the original wireless network, factoring in inflation, Mr. Jensen said.

Burgermaster bought 12 Windows-based iPAQ's to ensure that at least 6 are always operational. "They are computers, and we run them hard, 24/7," Mr. Jensen said. Batteries need recharging, for example, sometimes the iPAQ's, being computers, will crash. And "sometimes they don't want to connect."

But so vital are the wireless iPAQ's to Burgermaster's operation that Mr. Jensen requires the carhops to tether them to their wrists, at the risk of demotion. "If I find a carhop without a tether," he said, "they become a fountain person."