# Information is Power

*Jay Fiske*

Optimizing restaurant operations using the Internet of Things

Have you ever had any of your critical equipment fail without warning? If so, you know how integral your restaurant's HVAC, refrigeration, ovens, fryers and other equipment are to serving delicious, safe food in a comfortable environment. Failures can interfere with your operations and with your profits.

How well do you know your operations, and do you think you have a grasp on potentially disruptive issues? Ask yourself the following questions:

- Is your equipment operating efficiently?
- Will you be warned before equipment fails?
- Is your staff getting the most out of your equipment?
- How long does it take a technician to find and fix a problem?
- Are maintenance costs eroding your profits and adding unnecessary risk?

Access to even a modest amount of information about the use and performance of critical equipment can lead to substantial business benefits. Performance information can provide opportunities to:

- Enhance product quality and safety
- Proactively identify equipment usage or performance problems
- Reduce operational costs, including labor and utility costs
- Control maintenance costs
- Improve equipment uptime and performance

This is the idea behind applying the "Internet of Things" (IoT) to restaurants. The IoT is simply a way of connecting equipment to the internet to capture data for analysis and, in some cases, for remote control.

Beyond enterprise-wide control over thermostats and HVAC analytics, which are the most common starting points for IoT solutions in restaurants, operators are beginning to manage other critical aspects of their facilities, such as refrigeration and cooking equipment, through the Internet of Things. The case studies below describe how two companies have done just that.

Managing Refrigeration Assets

A major Pizza Hut franchise had difficulty managing its large number of refrigeration assets, including refrigerated prep tables used for holding ingredients. As a critical part of its operations, the prep tables are the final refrigerated stage for ingredients before they become a finished pizza. A prep table failure can disrupt operations significantly, reducing production capacity and threatening product quality and safety.

Prior to adding technology to the refrigerated prep tables, the staff at this franchise had to manually check the temperatures of the prep tables on a regular basis, recording the values using a pen and clipboard. Forgetting to check the temperature during the required time meant losing insight on the units' performance, as well as risking food quality and safety.

Franchise leadership decided to implement an IoT solution that could not only help them automate data collection and reporting on the refrigerated prep tables, but also tie that data in with an energy management system. This combination enabled enterprise-wide control over the thermostats and real-time HVAC system performance analytics, along with food safety and product-quality protection in the prep tables.

The IoT solution included wireless temperature sensors in the refrigerated prep tables, wireless smart thermostats, energy sensors in the electrical panels to track power consumption of individual pieces of equipment, and a gateway to tie all the components together and send the data to software in the cloud. The cloud-based software compiles and processes this raw data and pushes alerts and notifications to store personnel when the systems are not operating as they should. It also gives the senior management team 24/7 real-time remote access to any store's data, either through the online portal or through apps on mobile devices.

For example, their IoT system pushed an automated alert when it detected an unsafe temperature in one of the refrigeration units. The unit's energy-use pattern provided the data needed to detect the source of the problem. Armed with the data, the store manager dispatched a service technician, and the repair was completed quickly and effectively, minimizing any risk to food safety and product quality.

While the management team previously had no company-wide visibility into food safety issues, their IoT solution now sends weekly food safety reports to all managers. These reports enable the managers to identify patterns and behaviors that need to be corrected.

The Pizza Hut franchise can now quickly address any issues before they become liabilities. They also have insight into equipment performance, allowing for more cost-effective proactive repair, instead of expensive reactive repairs post-failure. This helps to keep their equipment uptime high and their restaurants at full capacity, while more customers can get delicious pizza sooner. Even better, because their IoT system includes energy management capabilities, the savings generated by reduced energy consumption and equipment maintenance costs drive a payback under 24 months.

Managing Cooking Assets

Like many restaurant operators, Arby's Restaurant Group was facing challenges tracking information about food quality and safety through the cooking and holding process. Their processes were largely manual, relying on pencil and paper logs to track time, temperatures and any necessary corrective actions. The manual process posed challenges, risking human error, offering limited archiving (paper can easily be lost or damaged), and requiring a laborintensive process that took up restaurant staff time, during which they were not available to serve customers.

When Arby's analyzed their processes, they realized they wanted a system that could automate the data collection and reporting process. They wanted to start with their most expensive, time-consuming and brand-critical process: cooking their famous roast beef. Arby's worked with the two oven manufacturers to factory-integrate a wireless module that would send all relevant data from the ovens to the IoT platform that Arby's had already deployed to all 1,000 of the restaurants (initially for controlling thermostats and analyzing HVAC performance).

The implemented wireless IoT solution connects directly with the oven's control board, pulling data such as cooking-probe temperature over time and any error codes the oven may generate. The data is then wirelessly broadcast to the IoT platform's gateway, which is connected to the store's internet connection.

The cloud-based software uses the oven data to create the log automatically, freeing staff time and ensuring accuracy, legibility and perpetual storage. The log is automatically emailed to the restaurant manager daily for review, while any alerts are sent in real time, allowing managers to quickly correct any issues that need to be addressed.

Now that the data tracking and reporting for one of the core cooking processes has been fully automated through the IoT platform, Arby's is expanding its visibility by integrating data from the fryers and all cold and hot holding food equipment. Data from the fryers is used to ensure they are being operated properly—for example, having sufficient oil filter cycles to maintain high product quality while not using excessive oil in order to control costs. Data from the cold and hot holding food equipment is collected automatically to support food safety reporting.

Finally, Arby's is integrating a wireless handheld probe when manual measurements are required (e.g., to take the temperature of beef on the slicer, the shake machine hopper or product in the cold-well such as cheese, meats and produce). The Bluetooth-enabled probe sends data to the IoT provider's app, automatically capturing the temperature data so that any measurements outside the acceptable range are highlighted, with the app showing a list of approved corrective actions.

With these steps, Arby's will have completely digitized and automated what was previously a labor-intensive manual process, while ensuring that its product quality and food safety are protected.

Implementing an IoT Solution

The good news is that little, if anything, needs to be done to a facility to provide the infrastructure necessary to support an IoT solution. Wi-fiis not a must-have, but the restaurant needs to have an internet connection of some type, such as Ethernet.

Most IoT components will communicate wirelessly to simplify installation and keep costs under control.

An IoT system will typically have a "hub" or "gateway" that communicates wirelessly with the various sensors, controls and pieces of equipment enabled for IoT. The gateway can connect to the facility's internet connection via Wi-Fi, Ethernet or even cellular, if necessary. For best security practices, the gateway should be installed outside the store's internet firewall. For extra data security, some IoT solutions are certified to PCI Level 1 compliance, the highest level of data security validation available provided by the payment card industry.

IoT on the Horizon

As an industry, restaurants are still in the early phases of adopting the Internet of Things to support their operations; however, it’s clear that the IoT is here to stay. IoT technologies have successfully addressed real operating challenges in restaurants, including food safety, cost reduction, product quality and labor savings.

It isn’t necessary for an operator to buy in to a full suite of IoT capabilities from the beginning. Because modern IoT solutions for restaurants are modular, many customers opt to “walk before they run,” starting with one set of capabilities (e.g., food safety data collection and automation) and then adding other capabilities (e.g., HVAC control and analytics) over time.

Ultimately, IoT platforms should relieve much of the overhead involved in running restaurants, freeing operators to focus on their core mission: serving delicious food in a comfortable environment, and making customers want to come back time and time again.

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