



INDUSTRY USE CASE

Commercial Kitchens and Food Processing

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IoT in the Food Processing Industry

The application of Internet of Things (IoT) technology for commercial kitchens in the food service industry can deliver benefits such as enhanced visibility into operations, maximized equipment availability and improved consistency of output. Altogether, IoT can simultaneously minimize food, labor and energy costs.

For those who manage a commercial kitchen, up-time is a crucial metric. Whether in fine dining or quick serve, an equipment failure impacts the food service operator's ability to produce and sell product. To make matters worse, customers aren't sympathetic as to why impacted menu items are unavailable or up to quality standards.

Commercial equipment repairs may be reactive in nature with failures during operating hours having a serious negative impact to the business. Once a problem is identified, it can take days to find a qualified technician, diagnose/troubleshoot, source parts and then implement a repair. This results in lost revenue and has an unfavorable effect on customer satisfaction.

Food consistency is another concern, especially for franchise operators where customers have elevated expectations for product quality. Many factors contribute

to the performance of kitchen equipment and it is crucial to understand how calibration and configuration settings factor into the equation. Without this insight, it is nearly impossible to deliver a consistent customer experience that meets brand expectations.

Businesses are always under pressure to reduce operating costs and this is especially true for commercial kitchens. A fryer that takes longer than normal to reach optimal temperature wastes energy. A cook that has to re-fire a dish reduces labor effectiveness. A compressor failure in a walk-in refrigeration unit increases food costs. It is more important than ever to find new ways to improve operational efficiency and provide full visibility into kitchen performance.

This entire scenario could be improved if there was a way to access and analyze data from commercial kitchen equipment. An IoT strategy can virtually eliminate unscheduled downtime by proactively monitoring sensors, automating diagnostic processes and identifying service facilities with the correct parts in stock. It also enables the ability to compare the operational performance of equipment across locations in order to improve consistency and reduce costs.

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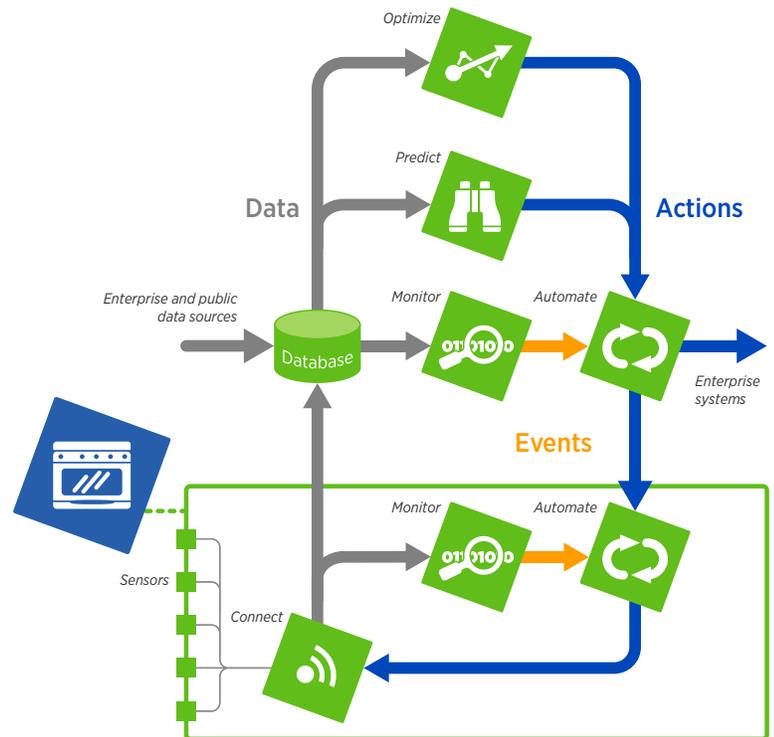
IoT: Improve Operational Performance for Commercial Kitchens

The primary function of IoT technology is to collect data from a broad variety of assets over an extended period of time and deliver that data to cloud-based (public or private) databases so that rules and analytics can be applied to the data.

Bsquare DataV™ is a complete end-to-end IoT solution, which enables businesses to maximize operational performance by combining traditional enterprise data with new data generated by smart, connected devices. Commercial kitchen appliances that are instrumented with sensors to capture key operational data are able to participate in an IoT solution.

DataV consists of five product components designed to bridge the gap between data-generating sensors and the business: Connect, Monitor, Automate, Predict and Optimize.

- Connect.** The foundation of IoT is to connect, through the most appropriate technology, physical assets and applications to networks, cloud-based databases and applications (the cloud may be public or private, on-premise or off-premise). A core function of the connect process is to intelligently filter, compress, or combine data sets to best reduce network costs. In many IoT scenarios, sometimes as much as half the cost of the overall system is comprised of network transport costs. By taking steps to reduce the volume of upstream data, costs can be substantially reduced.
- Monitor.** The information generated by physical assets and applications is monitored in real-time to identify anomalous conditions that may warrant a response. There are two critical factors to the monitor function which are typically overlooked in IoT systems. "Monitor" goes beyond the basic reactive display of operational data on a dashboard. Instead, it should translate to software intelligently analyzing realtime data feeds and applying heuristics (and occasionally dynamic) rule sets. Second, certain aspects of the



monitoring function should ideally occur on the actual device itself. This functionality is critical to provide faster responses to essential conditions and also facilitate key IoT operations in off-line scenarios.

- Automate.** A vast assortment of actions are typically essential in response to anomalous conditions detected by the monitor function. For instance, commands to the physical asset itself (e.g., initiate a local device restart), preventative maintenance alerts to operations and support teams, and sometimes instructions to external enterprise applications (e.g., inventory, support and trouble-ticketing systems). It is critical that a portion of this core functionality reside on the physical asset in order to permit an environment where corrective actions can be automatically implemented even when the asset is disconnected from the network itself.
- Predict.** Essentially one of the primary functions of an IoT system is to predict failures before they occur and

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take corrective action—be it automatically dispatched or manual intervention from maintenance or engineering personnel—so that unplanned downtime is minimized or even eliminated. This core ability is primarily a function of data analytics—surveying very large data sets over an extended period of time in order to best identify conditions that frequently precede failures. By virtue of this functionality, retail network operators can more easily determine that a failure is about to occur, identify what corrective measure, tools and personnel are required to prevent the specific failure, and schedule preventative maintenance measures at the optimal interval so that unplanned downtime is eliminated.

- **Optimize.** Ultimately the final key in attaining better business outcomes from asset data is to modify the operational parameters of the specified assets to best optimize efficiency. Not unlike predictive failure, this is achieved through the examination of large data sets across the entire operational scope, to determine and benchmark the operational parameters of the best performing equipment, and apply those parameters to other tools and equipment throughout the operation.

What is DataV?

For more than two decades, Bsquare has helped its customers extract business value from a broad array of physical assets by making them intelligent, connecting them, and using the data they generate to optimize business processes.

Bsquare DataV software solutions can be deployed by a wide variety of enterprises to create business-focused Internet of Things (IoT) systems that more effectively monitor device data, automate processes, predict events and produce better business outcomes.

Bsquare goes a step further by coupling its purpose-built DataV software with comprehensive analytic and engineering services that help organizations of all types make IoT a business reality.

How IoT Benefits the Operators of Commercial Kitchens

There are several ways in which IoT systems benefit not only the food service operator but also its ecosystem of service providers and equipment suppliers. Ultimately, these benefits lead to better product and customer satisfaction.

Increased Uptime

Unplanned downtime can result in significant revenue loss for retail industry operations. Devices can be located in remote regions and any factor that slows or extends the supply chain presents a serious roadblock to optimal operations. Unplanned downtime is one of the leading detractors to revenue and causes of increased operational costs. In terms of the retail industry, direct monetization of IoT benefits is primarily focused on uninterrupted service leading to increased revenue as well as lower costs due to reactive onsite maintenance but indirect, and less tangible, benefits also accrue through

avoiding damage to brand through embarrassing public disruptions of service. DataV Connect is installed directly on the kitchen equipment and intelligently collects and processes available data from sensors. The software can scale from large devices down to small controller boards. Logic running locally on the equipment can be configured to define data collection rules, including which data to transmit and how often. All communication is secured using industry standard encryption and data integrity is enforced.

Under normal connections, this data is sent to DataV Monitor, which provides real-time visibility into the health of the entire kitchen. For larger operations, dashboards can enable an operations manager to view multiple locations in a consolidated, easy to use format. This information can be tailored based on user profiles and accessed with a web browser or mobile app.

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Predictive Failure Analytics

Correctly designed IoT systems can reduce mechanical costs in a number of ways. Through the monitoring of physical asset data, the Remote Diagnostic Service (RDS) rate can be enhanced to reduce costly maintenance deployments. By aggregating and analyzing large data sets, operators can identify patterns and anomalies and benchmark those against historical trends to inform smarter decisions that can predict issues before it is too late.

Proactive measures can be initiated by virtue of insights gleaned from predictive analytics to inform progressive preventative maintenance protocols before failing equipment reaches a critical mass, therefore extending the lifecycle of equipment and minimizing unexpected costs.

DataV Predict can identify problems before they occur. Powerful data analytics can find leading indicators to a failure event and monitor for those conditions proactively. For example, an oven that takes an increasing amount of time to reach the proper temperature not only wastes energy but is typically a sign of a part that is about to fail. DataV enables the ability to proactively schedule the maintenance or repair at a time that is best for the business.

Asset Utilization

Foodservice operators that leverage technology advances to improve asset utilization, especially regarding energy consumption can create reduce costs that improve their competitive position. Critical infrastructure such as chillers are already instrumented for properties such as

sump/water level and ice thickness. IoT software can collect device data and establish patterns and trends that will help the operator to identify usage behavior and settings for best operation.

DataV Optimize can be used to understand how well a piece of equipment is operating and compare machine behavior across an entire population of devices. With a soft serve ice cream machine, consistency in the output of the product can vary depending on factors such as the temperature of the dispensing nozzle or storage tanks.

By running the data through machine learning and data analytics algorithms, an operator can determine the best calibration settings for a particular piece of equipment, which may vary based on environmental conditions. Data analytics can also uncover correlations in areas such as energy consumption and product waste, which can be used to reduce overall operating costs.

The Bottom Line

DataV is designed as a modular, scalable solution that easily integrates into existing infrastructure, making it an ideal choice for mixed environments. The architecture enables the business to install only the components needed to achieve the desired business outcomes. Whether on-premise or in the cloud, DataV represents a complete IoT solution for maximizing the performance of a commercial kitchen.

For more information, please visit bsquare.com or email us at sales@bsquare.com



For over two decades, Bsquare has helped its customers extract business value from a broad array of assets by making them intelligent, connecting them, and using data collected from them to improve business outcomes. Bsquare software solutions have been deployed by a wide variety of enterprises to create business-focused Internet of Things (IoT) systems that can more effectively monitor assets, analyze data, predict events, automate processes and, in general, optimize business outcomes. Bsquare couples innovative software with advanced professional services that help organizations of all types make IoT a business reality.