CalAmp®

Fresh Food: Managing FSMA & Quality with IoT Technology

Introduction

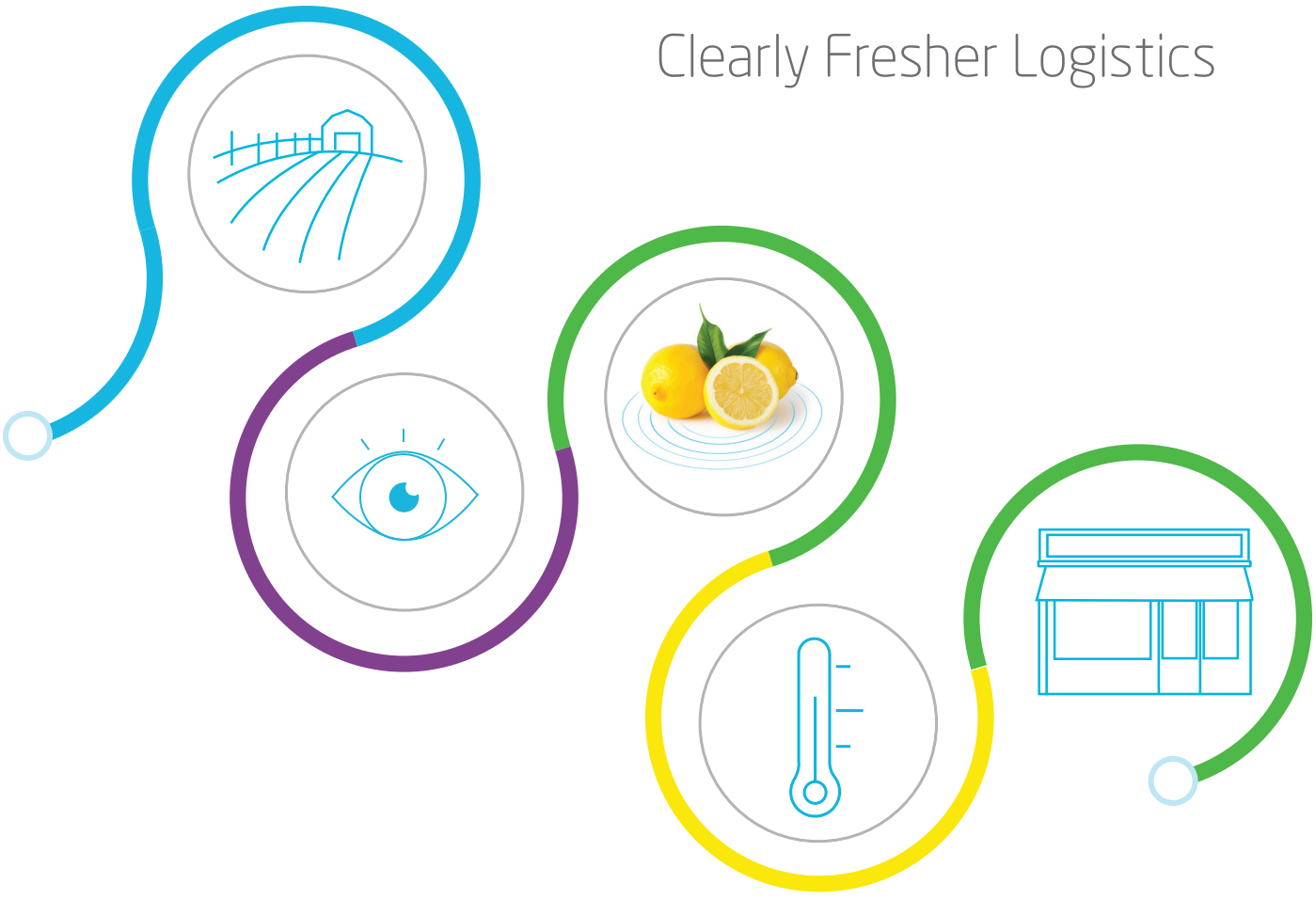
Why is food safety so important? Because each year, foodborne illnesses strike 48 million Americans according to the Food Safety Working Group, a joint federal and state agency collaboration. Food contamination is one of the reasons why the U.S. Food and Drug Administration (FDA) introduced the Food Safety Modernization Act (FSMA). The act, which began to take effect in April 2017, updates existing regulations and adds new rules to become the most extensive U. S. food safety reform since 1938.

The purpose of the FSMA is to shift food safety tactics from reactive to preventative throughout the entire supply chain. The regulatory update coincides with the increased demand for healthy, convenient and fresh food. The result is that supply chains are relying more and more on monitoring quality and safety using IoT technology.

Consumers Demand Fresh Goods

To accomplish these goals of delivering fresh and safe-to-eat food, the supply chain will need to adopt new processes and digital tools to comply with regulations and industry standards. Technology solutions that can automate and document will provide a competitive edge by continuously logging shipment condition data and transmitting it to the cloud for easy retrieval and compliance reporting.

IRI's 2017 Top Trends in Fresh Foods study found that grocery store "perimeter spending, including produce, fresh prepared foods, bakery, seafood and meat, has grown from $116 billion in 2013 to $140 billion in 2017, driving 54% of the industry growth." Therefore, retailers and processors seek reliable partners and suppliers to help them keep up with demand. While food from local farms is a trend, globally sourced food still makes up an estimated 15% of the U.S. food supply, including 50% of fresh fruits, 20% of fresh vegetables and 80% of seafood.



Three Food Safety Regulations

The connected economy means greater access to a global food supply and an increased risk of contamination at any stage along the supply chain. Therefore, three regulations provide requirements to maintain food safety. They are the Food Safety Modernization Act (FSMA), Foreign Supplier Verification Program (FSVP) and the Sanitary Transportation of Human and Animal Food Rule (Sanitary Transportation). They seek to minimize foodborne illness, and accompanying recalls, by catching the contamination incidents early before they reach the consumer. As a result, more of the burden of monitoring and reporting for food handling and transportation shifts onto suppliers, producers and transporters. IoT technology helps digitize some of the compliance requirements, such as the automatic records that document the chain of command and custody. Below is a quick overview of the regulations to provide background on how smart sensors and devices assist with monitoring the supply chain.

The Food & Drug Administration (FDA) finalized seven major rules to implement FSMA because they recognized that ensuring the safety of the food supply is a shared responsibility among many different points in the global supply chain. The FSMA rules make clear specific actions that must be taken at each of these points to prevent contamination.

While FSMA covers domestic production and transport, FSVP is an additional rule to protect perishables from non-U.S. origins. Per the FDA, "FSVP requires that importers verify that their suppliers are producing food using processes and procedures that offer the same level of public health protection as the preventive controls (PC) requirements in the preventive controls and current good manufacturing practices rules for human food and animal food and produce safety FSMA rules, and that the food is not adulterated and properly labeled with respect to allergens."

The Sanitary Transportation rule outlines procedures and standards for shipping and storing foodstuffs. It includes requirements for cold storage, pre-cooling and cleanliness of shipping containers and trucks before loading, and the monitoring of temperature and other factors during transit. To prove compliance, shippers must maintain temperature logs that show there have been no temperature breaches during the entire shipping and storage process. Manually tracking temperature and other environmental conditions consumes resources that could be allocated elsewhere. However, the technology of smart sensors and devices enable the digital capturing of key data continuously and in real-time that can help improve operations' bottom line.

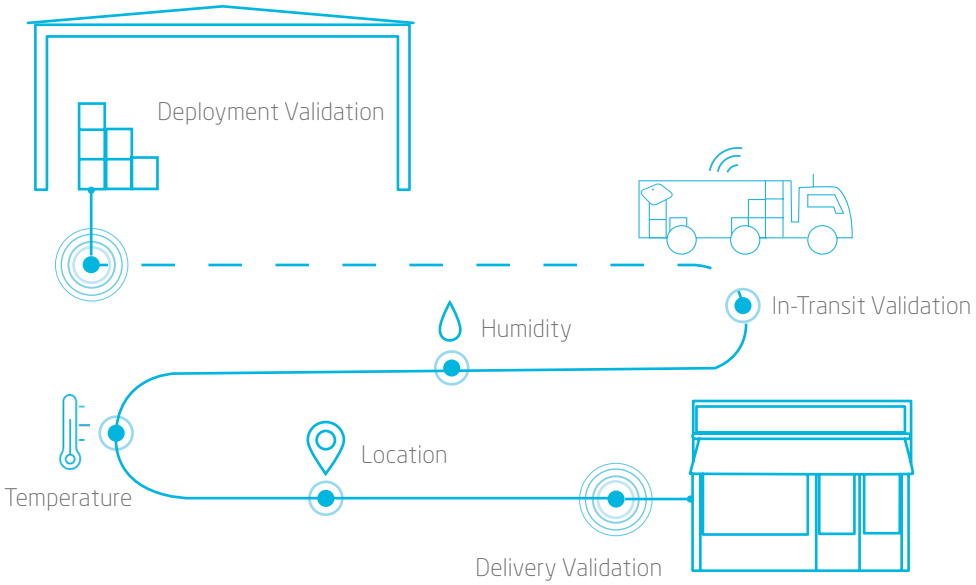
- The rule focuses on temperature, vehicle maintenance and sanitation for bulk foods in transit. Below is a summary:
  - Shippers must specify temperature requirements to carriers and define when food is no longer fit for consumption due to temperature fluctuations
  - Vehicles and equipment must be designed and maintained so that food is not contaminated
  - Carriers must document proof of sanitary conditions throughout the process

Lastly, manufacturers must create a written supply chain process to document procedures for recieving, recordkeeping and supplier verification activities. It helps companies ensure that foreign suppliers comply with the FSVP. IoT technology assists with this requirement by providing automatic electronic records and reports that can be used to show compliance with these three regulations.

Three Best Practices

Beyond regulatory compliance, the supply chain must operate efficiently and effectively. Stakeholders still need to profit while reducing the risk of food contamination and waste. Successful food supply chains typically have at least three things is common:

- Detailed understanding of current workflows and areas of risk
- Open communication among stakeholders along the entire chain
- Investment in technology solutions that help simplify communications and processes



Three IoT Technologies

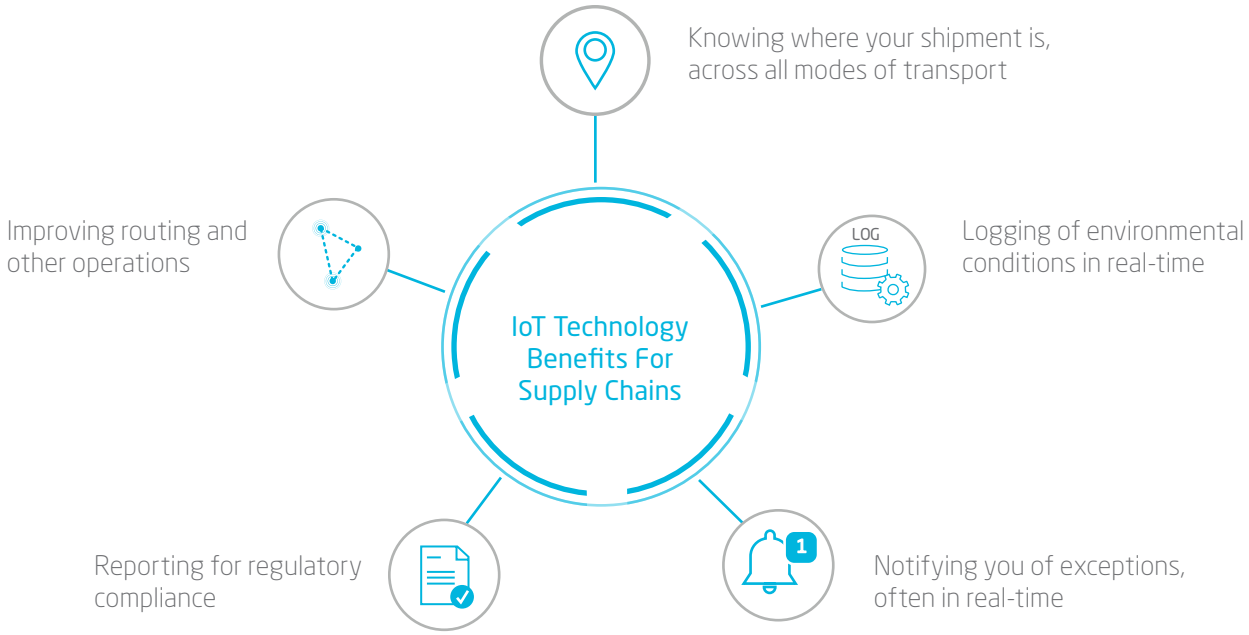
Technology helps reduce manual tasks, such as data collection, and provides easier transmission of information to key operations and quality assurance personnel. While there are a diverse range of solutions available for different parts of the supply chain, this guide reviews the benefits of having connected logistics to help maintain food quality and safety while in transit.

Telematics

Fleet telematics provides a two-way data channel that reports vehicle location, health and more while offering fleet managers up-to-date traffic, routing and other navigational information. Full-stack telematics solutions help operations determine the most efficient route to each destination, shows up-to-date information about the location of each truck, and helps manage vehicle health. The technology is also used to track non-powered assets such as trailers so they are easier to locate at large depots or out on the road.

ELDs

The electronic logging of a driver's hours of service benefits the supply chain in three ways. First, electronic logging devices (ELDs) offer safe driving improvements with the reduction of fatigued operators that could lead to a crash and damage shipments. The second is the adherence to schedules since drivers are truly limited on their availability (except when the rule is temporarily lifted by the government). Combined with telematics, it is best to have pre-planned routes with scheduled pickups and offloads. Lastly, the daily vehicle inspection report (DVIR) requirement means the truck and trailer get a walk around inspection to catch any safety issues, including those that could affect perishable loads such as a reefer's damaged cooling unit.



Shipment Tracking

As IoT technology continues to advance, users have the ability to capture more data – in real-time with more detail down to very small areas. In supply chains, this translates to monitoring shipments not only by location but also by certain environmental conditions that affect quality and safety. The documentation of the chain of custody and control helps traceability when an incident occurs, such as a listeria outbreak or moldy perishables. Automatic logging of data on temperature, humidity, light exposure and more offers an objective record. When the information transmits to the cloud for storage and analysis, alert notifications become available that trigger when parameters customized for breaches occur.

Connected to Information

Tying these three supply chain components together are the cloud-based applications that can be full-fledged platforms-as-a-service. The automatic transmission of data provides immediate access to real-time information from fleets and shipments, filtering for information that helps operations develop critical knowledge about a shipment's status. The ability to send alert notifications helps stakeholders react proactively, correcting out-of-compliance conditions before a valuable shipment is declared a total loss or causes an illness.

An IoT technology approach enables data-driven decisions to optimize operations on a continuous basis, which can lower costs, contamination incidents and waste. Real-time visibility changes the game by making it possible to address problems as they occur. If a perishable food shipment exceeds a certain environmental threshold, for example, it is easier to locate, check the condition and determine next steps that might include rerouting, salvaging or finding replacement goods to fulfill the order.

Conclusion

As today's global marketplace responds to the higher demand for fresh produce and ready-to-eat meals, the pressure on producers and logistics companies to provide safe, good quality products will only increase. Smaller, faster shipments for the last mile and yard coupled with a growing body of stricter regulations add another layer of complexity to the supply chain. Smarter logistics fueled with real-time data enables the improvement of processes, reduction of waste and delivery of compliant shipments. IoT technology helps supply chain operators achieve goals, especially now that visibility tracking is down to the pallet- and package-level.

The result is a supply chain that efficiently delivers perishable goods that comply with FSMA, FSVP, the Sanitary Transportation Rule and industry standards. Consumers benefit by having fresh, safe food to purchase and consume.

About CalAmp

CalAmp (Nasdaq: CAMP) is a technology solutions pioneer leading transformation in a global connected economy. We help reinvent businesses and improve lives around the globe with technology solutions that streamline complex IoT deployments and bring intelligence to the edge. Our software applications, scalable cloud services, and intelligent devices collect and assess business-critical data from mobile assets, cargo, companies, cities and people. We call this The New How, powering autonomous IoT interaction, facilitating efficient decision making, optimizing resource utilization, and improving road safety. CalAmp is headquartered in Irvine, California and has been publicly traded since 1983. LoJack is a wholly owned subsidiary of CalAmp. For more information, visit calamp.com, or LinkedIn, Twitter, YouTube or CalAmp Blog.

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