



Smart Retail Solutions Brief

Powering Smart Retail Solutions
with Open IoT Edge Computing



IoT Solutions
Alliance

The Internet of Things (IoT) and Edge Computing in Retail

The Internet of Things (IoT) is already having a significant impact on the retail industry and is providing tangible benefits for both consumers and retailers. Customers are receiving better in-store shopping experiences while retailers can differentiate with increased efficiencies that directly impact the bottom line.

The IoT allows retailers to instantly gather useful information during the customer purchasing period and unlock the power of insights within their businesses to scale better and address market challenges.

The more recent introduction of edge computing – that is the concept of performing data processing and analytics as close to the physical edge devices as possible, is enabling even more innovative smart retail solutions.



When applied to the retail sector, edge computing ensures that information processing, content collection, and data delivery are placed as near to customers and store operations as possible.

The Benefits of Edge Computing in the Retail Sector

Edge computing allows for the leveraging and integration of new technologies and smart IoT devices such as interactive displays, scanners, IP cameras, RFID systems and more. A whole new range of edge applications can then process this collected data to derive operational efficiencies and gather key insights into customer behavior.

IOTech's Edge Xpert platform is a key enabler for smart retail, providing an open framework that enables interoperability between heterogeneous IoT devices and applications at the edge. Edge Xpert provides a future-proof and vendor-neutral open platform that helps prevent lock-in to specific technology choices, significantly reducing integration costs and time to market for new IoT-enabled retail solutions.



Edge Use Case: Inventory Optimization and Smart Supply Chains

For some time now, retailers have been using GPS to track and route cargo. However, the utilization of RFID technology via enabled readers running at the edge, provides a much higher degree of accuracy of how close (in time and distance) specific merchandise is to a given store. By combining this information with instant sales data (e.g. from barcode readers at checkouts), the urgency of resupply to meet actual demand can be determined on a store by store basis. These edge computing insights can be visualized and actioned anywhere at any time.

An edge IoT-enabled retail supply chain can also use RFID technology to track assets across locations to improve security and better manage delivery options.

Computer vision combined with Artificial Intelligence (AI) deployed at the edge is being used to improve inventory management. Out-of-stock, over stock and shrinkage contributes to over \$1 trillion in lost revenues to retailers worldwide. AI can help retailers automatically analyze essential inventory data in real-time (or near real-time) to ensure that products are always available on the shelves and with the correct price tags.

A typical distribution center or warehouse is currently organized by aisles and shelves based on a fixed schematic. Edge computing allows for the warehouse of the future to be flexible, open space where automated pallets self-organize based on real-time demand.



The use of sensors and cameras can provide retailers with a vast amount of live data and analytics options to improve the customer experience and maximize selling opportunities in more innovative ways than ever.

Edge Use Case: Smarter Stores and Connected Consumers

Sensors and cameras carefully positioned around a store can collect useful data about both customer and staff movement. For example, customer queuing times and typical routes taken by customers around a store can be tracked and analysed to establish better ways to optimize and maximize sales opportunities.

Such findings can lead to redesign of the store layout and key product placement. Furthermore, the use of live computer vision and edge intelligence can determine if a customer is spending time in a specific product area, then in real-time direct a sales associate to help the customer.

With the rapid growth of online shopping, retailers are keen to replicate that frictionless customer experience in the physical store. They want to access the same type of rich data and high-performance analytics used in driving web and mobile shopping trips. Their goal is to craft a customer experience and collect detailed data to help them predict how customers will shop. Furthermore, the consumer also benefits by being made aware of in-store item availability, instant discounts and other customized experiences.



Edge Use Case: Predictive Maintenance and Environment Control

Most high street stores rely on complex equipment e.g. refrigeration units, lighting and Heating, Ventilation and Air Conditioning (HVAC) for their daily operations. When these units are equipped with smart sensors and devices, the data produced can be used by edge applications that can instantly detect failures or performance degradation requiring action.

Over time, a data picture can be built that can drive predictive maintenance in advance of equipment failures. This can ensure retail operations continue to function by mitigating any unplanned downtime that could result in lost income.

Further day to day savings are made by monitoring power consumption to ensure equipment is not operating inefficiently. Finally, store light, humidity and temperature levels can be automatically managed via smart edge applications using environmental data to improve the customer experience.



IOTech's Edge Xpert
edge software platform
is a key enabler for
retail focused edge
applications and
significantly reduces
integration costs and
time to market.



The Edge Xpert Advantage

Edge Xpert is an enhanced and commercially supported implementation of the Linux Foundation's open-source EdgeX Foundry software integration platform and provides the following benefits:

- Flexible open, vendor-neutral edge solution that enables interoperability between OT and IT retail systems
- Simplifies the connection and management of different data sources (e.g. camera devices, RFID scanners, barcode readers, digital signage) and applications in a retail environment
- Significantly reduces integration costs and time to market for new IoT solutions and products
- Enables device and sensor data to be ingested, normalized, aggregated, processed, analyzed and results acted upon in near real-time
- Supports a range of retail-focused use cases including people counting, line estimation, shift management, stock control and point-of-sales
- Extensible platform and multi-application provisioning allowing a system to easily evolve as additional retail capabilities are deployed



The Open Retail Initiative

Intel's Open Retail Initiative (ORI) is the first open-source Internet of Things (IoT) initiative that focuses on enabling retailers to unlock the power of data and insights within their businesses, to scale better and address market challenges. It allows innovators to work together by connecting technologies and data through common systems and open-source frameworks. The EdgeX Foundry and the Edge Xpert commercial implementation are key enablers for this integration and interoperability.

The aim of the ORI is to promote the free exchange of ideas within the retail industry in order to drive creative and technological advancement. Through collaborations within the EdgeX Foundry community and ecosystem, partners such as Canonical, Dell, Envirosell, HP, JD.com, JDA, Petrosoft, RetailNext, SAS, Shekel Brainweigh, SUSE, Toshiba Global Commerce Solutions, Verifone, VMware and IOTech, the initiative is removing barriers to technology adoption.

The Intel logo is displayed in a large, bold, black font. The background of the slide features a blurred image of a retail environment with a person's face partially visible on the right side.

intel®



ORI Solution Example: Intelligent Loss Prevention

Intelligent Loss Prevention is one of the important retail use cases that the ORI can help to advance. In order to show the art of the possible, IOTech in collaboration with Intel, Floodio, Edgify, Shekel and HP created an extensive demonstration showing a new Intelligent Loss Prevention solution to support self-checkout systems.

Demonstrated at the National Retail Federation (NRF) Trade Show, the ORI Intelligent Loss Prevention solution utilizes IOTech's Edge Xpert platform to merge all the available data at the edge in order to create a singular picture that helps combat both accidental and fraudulent loss at a self-checkout. Data is collected from a range of retail devices (including point-of-sale hardware, RFID scanners, weight scales and smart cameras) with analytics applications monitoring this data in real-time to capture events and report anomalies. Notifications of any suspicious activities can be automatically sent in real-time to an employee who can take required action without interrupting the customer's checkout process.

Follow this link for more details of the ORI solution: [Intelligent Loss Prevention Use Case](#)



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For additional information on Edge Xpert,
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