Intelligent Digital Shelving Solution Improves the Bottom Line for Retailers and Product Manufacturers

Industry
Retail Industry

Business Challenges
The store shelf is where consumers, retailers, and product manufacturers all converge; but opportunities to increase brand awareness, improve new product introduction success rates, and reduce pricing errors, among others, are being missed.

Executive Summary
Facing fierce price competition, retailers and product manufacturers are constantly looking for new ways to increase profitability. Simply put, this can be done by boosting sales volume, increasing advertising revenue, reducing operating costs, and minimizing inventory distortion. Inventory distortion is the cost of lost sales resulting from out-of-stock merchandise plus the losses from overstocks that must be deeply discounted in order to sell. Addressing all these avenues, a new technology, called micro-digital signage (MDS), places advertising and product information on small digital screens mounted on store shelves – the point-of-decision for consumers.

This intelligent digital shelving solution (Figure 1) is a tool for creating sales uplift by grabbing the attention of consumers as they are drawn to eye-catching, high-definition video and animation about products and in-store specials. The screens can help increase the success of new product launches by making sure consumers take notice of specific shelf locations as they stroll down the aisle. The advertising content can also generate incremental revenue from product manufacturers, who are able to connect with consumers when buying decisions are made. Moreover, intelligent digital shelving eliminates the need for employees to print and attach price labels on the shelves, thereby reducing operating cost and increasing the accuracy of shelf prices. Losses on perishable items that are overstocked or near their sell-by dates can be prevented since retailers are able to move them faster by informing consumers of price reductions via attention-getting, colorful media.
Who Will Benefit From This Solution

Retailers benefit from sales uplift, incremental advertising revenue, lower operating costs, and reduced overstocks.

Product manufacturers raise brand awareness and increase interest in new products where it matters most, when customers are deciding what to buy.

Consumers learn more about products (e.g., nutritional information, recipes) and in-store promotions.

Who Should Read This Solution

Blueprint

Retail chief marketing officers (CMOs) who want to learn more about the capabilities and benefits of the intelligent shelf solution and its complementary technologies, such as anonymous viewer analytics and remote management.

Retail IT professionals and system integrators (SIs) who could benefit from a recipe that explains how to deploy an intelligent shelf solution.

Business Objectives

The retail food industry faces several critical business issues related to increasing sales and decreasing operating costs:

- Boost sales volume by drawing more shoppers into stores and getting loyal customers to spend more.

  A differentiated shopping experience motivates consumers to come back frequently and shop longer. The digital age has provided retailers with a multitude of ways (e.g., digital signage, loyalty card rewards, and mobile apps) to interact with consumers in a more valuable and memorable manner.

- Increase advertising revenue by offering product manufacturers new ways to effectively message to consumers.

  Many product manufacturers see a good return on investment (ROI) from advertising, where leading brands spend three to nine percent of revenues.\(^1\)

- Reduce operating costs associated with the significant effort to print, check, and change price labels in order to keep store shelves and displays up to date.

  With respect to shelf labels, it is the legal responsibility of retailers to ensure consistent pricing between what's advertised on the shelf and what's being charged at the checkout.\(^2\)

- Minimize inventory distortion by selling nearly-expired product before its expiration date.

  Retailers can increase profit by as much as four percent when the loss on perishables is reduced by 25 percent. In addition to preventing spoilage that leads to inventory distortion, the solution facilitates effective cross-selling and promotions that can further increase a retailer's profitability. Food waste reduction not only benefits the retailer's bottom line, but it also conveys a social responsibility and an environmentally-friendly image.\(^3\)

Solution Overview

The intelligent shelf solution includes components deployed on the store floor, store back office or headquarters, and in the cloud, as illustrated by Figure 2. The following describes the essential ingredients as well as two complementary solutions.

The digital age has provided retailers with a multitude of ways (e.g., digital signage, loyalty programs, and mobile apps) to interact with consumers in a more valuable and memorable manner.
Store floor

1) Micro-digital signs
   Designed to attract consumer attention to new product launches and promotions, small, 4.3 inch (8.9 cm) MDS displays can show product prices, advertisements, or other information with intense color and brilliance.

2) Media player
   The media player receives digital content from a back office system and drives it to the micro-digital signs.

3) Optional enhancement 1: Anonymous Viewer Analytics (AVA)
   When consumers are near an intelligent shelf, retailers can learn more about them using AVA technology employed by Intel® Audience Impression Metric Suite (Intel® AIM Suite). The solution collects dwell times and consumer demographic information such as age range and gender - all anonymously and while respecting viewer privacy. This consumer data can be used to show directed advertisements, as in showing content that is of interest to the person standing in front of the store shelf. Moreover, retailers and product manufacturers get access to quantitative data that indicates the effectiveness of promotions such as impression counts, viewer demographics, and dwell times, all supported by Intel AIM Suite running on Intel processors.

4) Remote management for media player:
   Retail IT departments can minimize costly onsite repair visits using Intel® Active Management Technology (Intel® AMT) to remotely monitor, diagnose, and fix software issues on devices in-store. This includes managing the media player in this solution and could be used with other retail systems throughout the store, such as digital signage, kiosk systems, and vending machines. See #2 in the following section to learn about the management capabilities of the IT console.

Figure 2. High-Level Intelligent Digital Shelving Solution Diagram

SOLUTION BLUEPRINT
Retail Solution
Store Back Office Or Headquarters

1) Content Management System (CMS)

Managing a digital signage infrastructure and its supporting software is not a trivial task. But retailers can simplify the entire process with the Intel® Retail Client Manager (Intel® RCM), an intelligent, intuitive CMS solution for managing content across customer-facing retail devices, such as digital signs, self-service stations, and point-of-sale terminals. This software solution delivers a seamless and consistent experience that is personalized, relevant, and meaningful.

Figure 3 shows an Intel RCM screenshot of a single monitor broken into 9 individual (480x272) MDS displays on one shelf row.

2) IT console with Intel® Active Management Technology (Intel® AMT):

Retailers can manage all their media players (connected to the micro-digital signs) from a centralized, remote location, like the store back office or headquarters, using Intel AMT. The technology enables technicians to power-cycle machines and repair software issues, along with other device management tasks. A keyboard-video-mouse (KVM) feature allows IT administrators to control the system as if they're sitting right in front of it, even when the operating system does not respond or the system is down. This secure link can also be used to send software updates and security patches between individual machines and headquarters.

Solution Benefits

The intelligent shelf solution helps address several challenges facing retailers and product manufacturers by:

... getting customers to pay more attention to new products to boost sales

Micro-digital signage (MDS) playing video and animation can direct shoppers’ attention toward products not placed at eye level or deliver marketing messages that could compel them to try something new.

... providing new opportunities for retailers to capture advertising revenue

Intelligent digital shelving offers product manufacturers an opportunity to message consumers when they are making product selections.

... changing shelf prices and signage electronically to reduce operating cost

Intelligent digital shelving enables retailers to lower operating costs associated with regularly updating price tags throughout the store, and to improve pricing accuracy between advertised and actual prices.

... running special promotions on clearance or soon-to-expire items

Intelligent digital shelving help retailers raise awareness on products they want to move quickly, possibly by offering a lower price. This can be an effective way to clear out old inventory before a product transition, such as a packaging change or a new version.

Solution Implementation

The purpose of this section is to provide retail IT professionals and SIs detailed information on deploying the intelligent shelf solution.

There are two deployment paths:

- Pre-integrated: Flextronics, working with Intel, offers an integrated solution, including store shelves, MDS displays, media player, and optical sensor. For more information, visit www.flextronics.com.
- In-house development: Retailers or SIs can integrate the solution components, which are described in the following and shown in Figure 2.

Cloud

1) Content Management System (CMS)

Intel RCM is managed by an RCM Server.

2) Optional enhancement 1: Intel® Audience Impression Metric Suite (Intel® AIM Suite)

Intel AIM Suite is supported by a cloud server.
Store floor

1) Micro-digital signs
   a) Example specification:
      • 4.3 inch (8.9 cm) MDS displays with a resolution of 480x272 pixels.
      • Typically 9 to 12 screens per row, connected via USB.
      • A switch on the unit used to configure the display order.
   b) Where to buy: MDS display manufacturers and distributors
      • Display Solution*: The company mounts displays onto their printed circuit boards, which integrate a DisplayLink* component and software to support the configuration of multiple displays over USB. (www.display-solution.com/produkte/intelligne_tft/s/mcm_multi_cell_monitors.html).
      • Crystal Display Systems*: Display distributor (www.crystal-display.com).

2) Media player
   a) Specifications
      • Obtain a media player based on an Intel® Core™ i3, Intel® Core™ i5, or Intel® Core™ i7 processor to drive up to 72 MDS displays, as illustrated in Figure 4.
      • The processing power required depends on the number of MDS displays and whether Intel AIM suite is activated.
      • Use the test results in Figure 5 to select a media player with sufficient performance. During testing, every third MDS screen ran video while the others displayed a rotating sequence of still images. Performance results may vary slightly depending on the test environment. Rorke® Paladin* media players and Intel® NUC units were used in the testing.
   b) Where to buy: Media player

This data shows an Intel Core i5 or Intel Core i7 processor-based system is needed to run six display rows (9 to 12 displays each) with or without Intel AIM Suite. An Intel Core i5 processor-based system or an Intel NUC (equipped with an Intel Core i3 processor) has sufficient power to run three rows of displays. The preceding provides just two examples of how to interpret the test data.

Figure 4. Intelligent Shelf Deployment Scenario
### Intel® NUC with Intel® Core™ i3-3217U Processor

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### Rorke® RGS Paladin* with Intel® i5-3550S Processor

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### Intel® Core™ (I7-3700) Processor-based Media Player

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3) **Video over USB**

   a) **Specifications**
   
   - This is the technology used to run video over USB, providing smooth video playback and a low latency connection.

   b) **Where to buy:**
   
   - [DisplayLink*](http://www.displaylink.com)

4) **Camera for Intel® Audience Impression Metric Suite (Intel® AIM Suite)**

   a) **Specifications**
   
   - USB or Ethernet connection.
   - Brightly lit, even illuminated, indoor environment.
   - Face detection up to 25 feet (8 meters).
   - Camera resolution of 640 x 480 or 800 x 500.

   b) **Where to buy:**
   
   - Axis* M1054, Q1602 or 1604.
   - Creative* LivCam Optia AF.
   - HP* WebCam HD-3110.
   - Logitech* HD Webcam C910/C920 or Quicksam Pro 9000 (Logitech 2.51 driver required).
   - Microsoft* LifeCam Cinema or HD-3000.

5) **Intel® Retail Client Manager (Intel® RCM)**

   a) **Specifications**
   
   - Software must be installed on three pieces of equipment: media player, a PC running the Intel RCM Campaign Manager, and an Intel RCM Backend Server.
   - The Intel RCM Campaign Manager can run on any Intel® processor-based PC, workstation, or laptop.

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**Figure 5.** Media Player Test Results
6) Intel® Audience Impression Metric Suite (Intel® AIM Suite)
   a) Specifications
      • The client software runs on a media player (see #2) and requires a USB camera (see #4).
      • Intel AIM Suite also requires a license for cloud services.
   b) Where to buy: Intel
      • Intel AIM Suite software is preloaded on the media players listed in 2b.

7) Intel® Active Management Technology (Intel® AMT)
   a) Specifications
      • The client software runs on a media player based on an Intel® Core™ vPro™ processor (see #2). Note: Intel Core i3 processors do not support Intel AMT.
      • Intel AMT software can also be added to an existing IT console.
   b) Where to buy: Intel AMT Software
      • Intel AMT software for the IT console is included in the Intel RCM Campaign Manager.

8) McAfee* Embedded Control Security Software
   a) Specifications
      • The security software secures retail systems from malware and attacks by hackers and cybercriminals.
   b) Where to buy: McAfee*
      • Download free trial software at www.mcafee.com/us/products/embedded-control.aspx

Intel RCM Gold includes Intel AIM Silver.
For Intel AIM Gold, contact your Intel field sales representative.

For system integrators interested in buying Intel RCM directly from Intel, please contact your Intel field sales representative for more information.
Requests are accepted on a case-by-case basis.

Figure 6. Infrastructure for Intel® Retail Client Manager (Intel® RCM)
SOLUTION BLUEPRINT
Retail Solution

Summary
The intelligent shelf solution helps retailers accomplish several objectives, including boosting sales volume, increasing advertising revenue, reducing operating costs, and minimizing inventory distortion. What’s unique about the solution is the ability to play nearly any type of media right where consumers are shopping, and when the information is most relevant and valuable. The Intel RCM enables retailers to easily create campaigns that are downloaded to an Intel Core processor-based media player, which sends content to up to 72 micro-digital signage screens. Retailers can also run Intel AIM Suite, an anonymous video analytics solution, to detect audience demographics and provide information on consumer dwell times for promotions. The media player may be managed via Intel AMT and secured using McAfee Embedded Control Security Software.

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4 Requires activation and a system with a corporate network connection, an Intel® AMT-enabled chipset, network hardware and software. For notebooks, Intel AMT may be unavailable or limited over a host OS-based VPN, when connecting wirelessly, on battery power, sleeping, hibernating or powered off. Results dependent upon hardware, setup and configuration. For more information, visit Intel® Active Management Technology.

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