



Whitepaper

Food for thought

Retail video trends and doing more for your organization

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Introduction

Video surveillance has played an important role in retail stores for decades, and for years analog CCTV cameras have been used as a reactive tool to help reduce loss and perform routine investigations. What if you could do more with your video by moving from reactive to proactive?

Digital IP video surveillance is changing the way food retailers run their stores by smartening up video technology. Traditional asset protection trends continue to evolve with IP video's increased functionality, such as monitoring dwell time at displays for high theft items. Retailers can proactively identify where to place the next end-cap with heat mapping. Employee compliance and productivity can be ensured and improved through the use of surveillance footage.

A survey recently conducted by FMI and Axis Communications identified key trends in video. Whether retailers are beginning to deploy or have an established IP video solution in place, the benefits of IP video reach various levels of a store from safety and Assets Protection (AP) to distribution and operations to merchandising and marketing. With IP video, food retailers and other stakeholders are doing more for their stores.

1 Research method

A request was sent to the FMI Asset Protection Council, Risk and Safety Committee and Supply Chain committee in September 2012 via email. Respondents were asked how they were using video across their Assets Protection/Loss Prevention departments and throughout their organization in an effort to be a more proactive business partner. A reminder was also sent in an effort to boost the response rate.

A total of 32 out of 55 responded to the request. Recognizing it is impossible to survey all operators, FMI believes the sample is representative of the food retailing industry as a whole and information discussed in this whitepaper provides an accurate picture of trends in the industry.

2 Traditional video surveillance landscape

Video surveillance has become common practice amongst food retailers' AP teams, and amongst those surveyed many are at various stages of implementation in their video solutions. While many food retailers still have a traditional analog system consisting of coax cabling, analog cameras, and an onsite recording device such as a DVR, most retailers today are moving toward hybrid analog/digital solutions or are moving to fully IP-based systems.

This shift to digital technology is seen across many industries leveraging video surveillance and, although retailers have been slow to adopt this technology compared to other markets such as education and city surveillance, research indicates a movement toward IP-based solutions. The FMI Retail Video Trends survey – as well as a similar survey conducted by the Loss Prevention Research Council (LPRC)¹ – indicates that retailers are seeing the advanced capabilities and benefits of moving to an IP surveillance system and are taking various paths to migrate their surveillance into the digital world.

¹ The study "CCTV in Retail 2012" was conducted by the Loss Prevention Research Council and was funded by Axis Communications. For more information on this study please visit www.axis.com/corporate/press/releases/viewstory.php?case_id=2753

For example, food retailers with existing analog cameras are leveraging video encoders to gain a range of IP benefits including easier remote access to video and intelligent capabilities on the edge such as motion detection and camera tampering alarms. This means that they are protecting their existing investment in analog technology and have a stepping stone to move toward a fully-IP system.

Even before retailers are actualizing the fullest capabilities of IP with third party Video Content Analytics (VCA) providers, they are able to take advantage of some entry level analytics that reside on IP cameras and video encoders. For example, cross-line detection is used for monitoring restricted areas, and active camera tampering is utilized to protect cameras against acts of vandalism and unauthorized adjustments to the field of view. It can even be used to tell the LP manager/store owner when a camera is NOT recording – well before video of the area is needed.

While traditional CCTV systems have been used for deterrence and incident review, the results of the FMI Retail Video Trends survey have indicated that many food retailers are finding more proactive and intelligent means of leveraging their video surveillance investment for AP as well as across other departments. These advanced capabilities are discussed further in the following sections.

3 Trends and advanced functionality for AP

AP teams at food retailers have identified several ways they are proactively leveraging their video surveillance system including: monitoring for customer and employee theft, keeping tabs on organized retail crime (ORC) activity such as product sweeping, for incident and perpetrator capture, and by linking video to exception-based analysis.

Throughout the store, AP teams are monitoring certain displays of high-theft items through the use of advanced motion detection and cross-line detection. Retailers are also utilizing the system to ensure compliance to physical security and other food safety policies. AP teams additionally are utilizing auto-tracking capabilities and video-triggered notifications to monitor for and send alerts concerning suspicious persons or behavior.

At checkout, through partnerships with third party software providers, food retailers are leveraging computer systems to monitor for sweet-hearting, bottom of basket loss, and self-checkout scams. With POS integration, retailers are also able to tag a video event and tie it to the corresponding POS transaction for quick review of purchases.

Many retailers are beginning to integrate video with other systems including EAS, alarms, access control, POS, and exception-based reporting. The video can also be leveraged in partnership with law enforcement for investigations, video verification to reduce false alarms, and for live monitoring of the store in a crisis situation.

Additionally, AP teams can add to their return on investment by offering video surveillance as a service to vendors in hypermarkets. This can be a standalone video surveillance system or a cloud solution. For example, a food retailer can offer video surveillance as part of a sublease within the store including coffee providers, banks, and quick serve restaurants.

4 Cross-functionality: video across the organization

AP is not the only driver for video usage and Video Content Analysis, as many retailers are finding that they can attach quantifiable ROI across various departments and use video for business intelligence. The results of the FMI Retail Video Trends survey have indicated that many food retailers are finding and exploring a much broader use of video across the entire organization including: safety and risk management, operations, marketing and merchandising, distribution and transportation, and other various uses.

4.1 Safety and risk management

Hand in hand with the legal departments, safety and risk management teams are benefiting from monitoring the store and surrounding property for compliance with safety procedures as well as risk mitigation. They are able to access live video as well as immediately review footage in order to prevent potential onsite injuries and to better understand how they occur. Additionally, high-quality HDTV and megapixel footage can be used to review for false claims of slip and falls and other injury reports.

Food preparation areas are also being monitored for compliance with food safety procedures as well as to better understand the cause of loss and/or risks of cross-contamination. Video can be utilized to ensure there are no instances of intentional contaminants and bio-terrorism. With IP video, managers covering many stores are remotely viewing video as a cost-effective means for compliance checks in food preparation areas as well as other audits throughout the store without having to physically travel onsite.

Both in-store and parking lot surveillance are important for safety and risk management as these teams can partner with local law enforcement and other organizations in the private sector in emergency situations such as abductions, AMBER Alerts, natural disasters, hostage situations, and active shooter scenarios.

4.2 Marketing and merchandising

Marketing and merchandising teams are now utilizing video as well as third party analytics and analysis solutions to better understand customer buying behavior, to measure marketing effectiveness, and to monitor stores for display compliance as well as out of stocks. VCA also sheds insights into the pinch points of the customer path to purchase and helps identify key data to improve product placement that grows the basket and ultimately the bottom line.

With dwell time and people counting analytics, marketing teams can better understand effectiveness of marketing promotions, monitor display effectiveness of internal and vendor store promotions, as well as observe customer behaviors as they view displays in real time. For further ROI, marketing and merchandising teams can sell video as part of an agreement for vendors to monitor their own displays for compliance, effectiveness, and customer behavior.

It is also becoming increasingly more important not only to identify customer buying behavior but the missed opportunities and data related to customers who did not buy. High-quality, intelligent video can certainly give context to these types of scenarios. Technology is helping retailers become smarter when it comes to interpreting all the data points within their store by ensuring their technology divisions are based upon open architecture designed to work together. The increased offering of software technology, analytics, and video working together can reveal precise targeted and objective data. This contributes to better decisions concerning space, assortment, and price optimization.

Merchandising teams can also take advantage of video by monitoring for out of stocks, reviewing footage and analytics to determine buying patterns of high turn-over produce items, and to ensure safety regulations are met on shelves and in back rooms. Merchandising teams are also benefiting from heat mapping analytics to better understand customer traffic flow and review store layouts for effectiveness. Technology has enabled the retailer to be savvier with brand and assortment optimization.

4.3 Operations

As Assets Protection teams build out their video systems, they are looking for partnerships that can help to better the organization, and one of the main teams benefitting from this today is operations. The recent survey conducted by the LPRC indicates that 93 percent of retailers who use video for cross-functional purposes are seeing a positive impact on operations. IP video technology can be a tremendous tool for operations teams by helping to improve and drive sales as well as enhance customer service.

Many of the same analytics already used by other teams in the organization can be leveraged by the operations team by interpreting the data to suit their needs. For example, people counting (which is utilized by marketing and merchandising teams to understand effectiveness of promotions and store displays) can be reviewed by operations teams to better understand customer flow and for proper staff scheduling. Operations teams are also taking advantage of dwell time and queue monitoring to monitor customer wait times in certain departments such as deli, floral and pharmacies. Advanced analytics can also be used to monitor sales conversion rates, labor/customer count ratios, end cap effectiveness, and efficiency of service counters. If done in near real-time, store managers can effectively reassign staff to satisfy customer needs before a complaint arises.

The FMI Retail Video Trends survey also indicates that video is being utilized by operations teams to review Direct Store Delivery (DSD) and receiving procedures, to conduct remote store and food safety audits, as well as to monitor coolers and freezers for temperature readings and potential leaks.

4.4 Distribution and transportation

Food retailers have indicated that they are also using IP video to monitor distribution and transportation for the protection and safety of associates. Some examples described in the FMI Retail Video Trends survey include:

- > monitoring time clocks, aisles, exit/entry points and loading docks for safety and compliance
- > accident investigations
- > truck lot surveillance
- > warehouse injury investigations
- > forklift operating safety
- > to ensure correct safety and product handling procedures for loading and unloading shipments.

Retailers are also taking advantage of video surveillance to monitor employee productivity as well as to conduct reviews of the receiving process, including unattended deliveries with access control integration.

In-truck surveillance is allowing retailers to review driver safety and improve behaviors by capturing video of specified G forces, speed, hard turns, rapid acceleration, impact forces, collision, and overall receipt of goods upon delivery.

4.5 Other various uses

The FMI Retail Video Trends survey results also include some miscellaneous uses of video. For example, some food retailers are utilizing IP video to monitor contractor progress at new construction projects and facilities to ensure safety regulations and company standards are being met, as well as the project timeframe itself.

Additionally, where traditionally IT teams have hesitated to put video on the network, advances in IP technology and the benefits of advanced analytics for business intelligence have led to more IT managers coming on board. As IP video becomes integrated with other systems including POS and access control, IT managers are able to consolidate infrastructure, service time, and cost, while giving further cost effectiveness to devices such as servers, switches, and cabling. Video is adding more value to the IT manager's position by enabling them to offer additional benefits to other departments leveraging the technology.

5 Implications for scalability and future capabilities

Although many food retailers are utilizing IP video to achieve better business intelligence and effectiveness, there are some further challenges and desired capabilities indicated in the FMI Retail Video Trends survey.

5.1 Bandwidth and storage

A common request concerns more/better bandwidth and storage options. With advances in IP technology including H.264 compression, edge storage and hosted video, video is increasingly creating a smaller footprint on the network, especially during high-traffic hours. Additionally, retailers will see even more advanced functionality available on the edge, which removes some of the bandwidth and storage concerns by putting the bulk of the load directly on the camera or video encoder. For instance high-quality HDTV video can be stored on the IP camera's internal SD card while a second lower frame rate, lower resolution (less data) video stream is sent over the network.

Retailers also have the option for remote storage in the cloud, local storage on a network attached storage (NAS) device, as well as decentralized storage directly on the camera with SD cards. This means that video can be stored locally during peak times and then uploaded during off hours for additional bandwidth savings. With these various means of storage, retailers also have the ability for parallel redundant recordings of critical applications.

5.2 Infrastructure costs

Food retailers are asking for lower costs especially on infrastructure. Since cabling is a major existing investment from analog systems, retailers are able to utilize video encoders and analog-to-digital media converters to protect this investment as they migrate to IP. IP technology also allows for reduced cabling need and power consumption via Power over Ethernet (PoE) that uses one cable for power and data transmission. Furthermore, with HDTV image quality and other features such as panoramic view and 9:16 Corridor Format, retailers can take advantage of lower camera counts when compared to traditional analog installations.





Figure 1: Image taken from a “regular” widescreen-orientated camera (left) and image taken from an HDTV camera with the view rotated for 9:16 Corridor Format (right)

Additionally, where a store’s IT infrastructure likely already utilizes servers and switches, IT departments can increase the return on this investment by adding further value to the network with IP video.

5.3 Difficult lighting conditions

As lighting concerns continue to be an issue for food retailers, so too does the need for affordable infrared and “night vision” cameras. As IP camera innovation continues, there are more affordable options to combat these lighting issues including entry level thermal network cameras for detection in complete darkness as well as cameras with the ability to see color images in near darkness. These cameras, which provide HDTV imaging in full color and with extremely low noise, can see down to as low as .05 lux (less than moonlight) due to the sensor, lens, and image processing power combination of the camera.



Figure 2: Image taken from a “regular” camera in a smoky hallway (left) and from a thermal network camera (right)



Figure 3: Comparison images showing a “regular” camera at 0.03 lux (left) and a camera utilizing advanced low light technology that finds the light in a scene for full color image (right)

These advanced lighting technologies can mean increased assets protection of vulnerable areas with low-lighting conditions such as parking lots, cash wrap rooms, stock rooms, and loading docks, as well as further cost savings to food retailers since it is no longer necessary to keep the lights on during off hours.

Additionally, backlighting at entrances continues to prove troublesome with morning and midafternoon sun causing silhouettes and “haloing” as customers enter. But with advances in wide dynamic range (WDR), food retailers are able to see more in those difficult bright light scenarios by decreasing the blooming effect that sunlight causes and giving a clearer image.



Figure 5: Image from a camera utilizing enhanced Wide Dynamic Range with Dynamic Capture for backlight compensation

5.4 System outage detection

As is the case with many complex systems, food retailers are looking for ways to be alerted when there is a break in their video system performance. The FMI Retail Video Trends survey results indicate that food retailers are looking for a range of options from receiving alerts when there is a camera or other system component outage to automated repair ticket generation.

While the complete advanced functionality concerning automated repair ticket generation has yet to be seen, there are some current technologies that can help with system outage detection and maintenance. On top of Active Tampering analytics found in-camera / in-encoder, some systems enact further active health monitoring whereby the “sibling” cameras on the system can recognize if there is an outage and generate an error report.

5.5 Remote video monitoring and access

In traditional analog systems, a viewer must be on site to gain access to video; however with advancements in IP technology – including cloud computing and hosted video – managers can gain easier remote viewing and even access video via smart phones and other Internet-enabled devices. Cloud-enabled video is especially useful for hypermarkets and parallel mission critical applications that are on demand versus on premise, have many locations to monitor with low camera counts at each, as well as when operational expenses are more advantageous than capital expenses.

With IP video technology, food retailers are able to see inside their stores without the expense of travel to be on site. With the ability to give restricted access to multiple users, anyone within the organization who has the rights can virtually visit their locations to gather specific intelligence on what is happening in stores, in real time.

5.6 Mobile apps

Many of the retailers who responded to the survey indicated that they were looking for mobile apps to enable them to view live and recorded video on-the-go. While there are apps that exist today with these capabilities, there are also apps with even more advanced functionality.

Technology partners in the network video space continue to evolve integration enabling video context to in-aisle triggers for high theft products. Additionally, retail technology partners are working together with source tag, RFID, and POS partners to identify attainable strategies for Mobile POS applications that are still in the early adoption phase.

As technology continues to grow and more video-enabled applications are running on handheld devices, the amount of information and data that can be collected and pushed from smart phones and tablets to the system will continue to add value to the in-store video technology system for applications beyond security and assets protection.

5.7 Onboard vehicle cameras

Another request indicated in the FMI Retail Video Trends survey is that food retailers are looking for surveillance options that can be installed in trailers to better monitor loading and unloading processes as well as store deliveries. Some unique challenges arise from these types of installations including vibrations from the truck motor and backlighting issues when trailer doors are open. Additionally, if these cameras are not covertly installed, they may be prone to tampering and vandalism.

There are some options for ruggedized cameras that can withstand the vibration challenges of onboard video surveillance. Further advancements however can be made to address the unique challenges of delivery monitoring.

5.8 Advanced business intelligence

Certainly there are plenty of green field opportunities to leverage evolving technology to address the demands of Mobile POS and unifying the customer experience in the Omnichannel world. As indicated by Moore's Law - an observation named after Intel's co-founder that states that processing power doubles about every 18 months while technology size and cost remains constant – the rate of technology growth is astounding and the food retailer industry must continue to plan and lay the foundation for future innovations or risk falling behind.

Although there have been many advances in recent years to IP video technology and image quality, still more can be done. By adding advanced analytics to open platforms on the cameras, food retailers will continue to see more and better business intelligence coming from their video systems and can leverage this system across the entire organization.