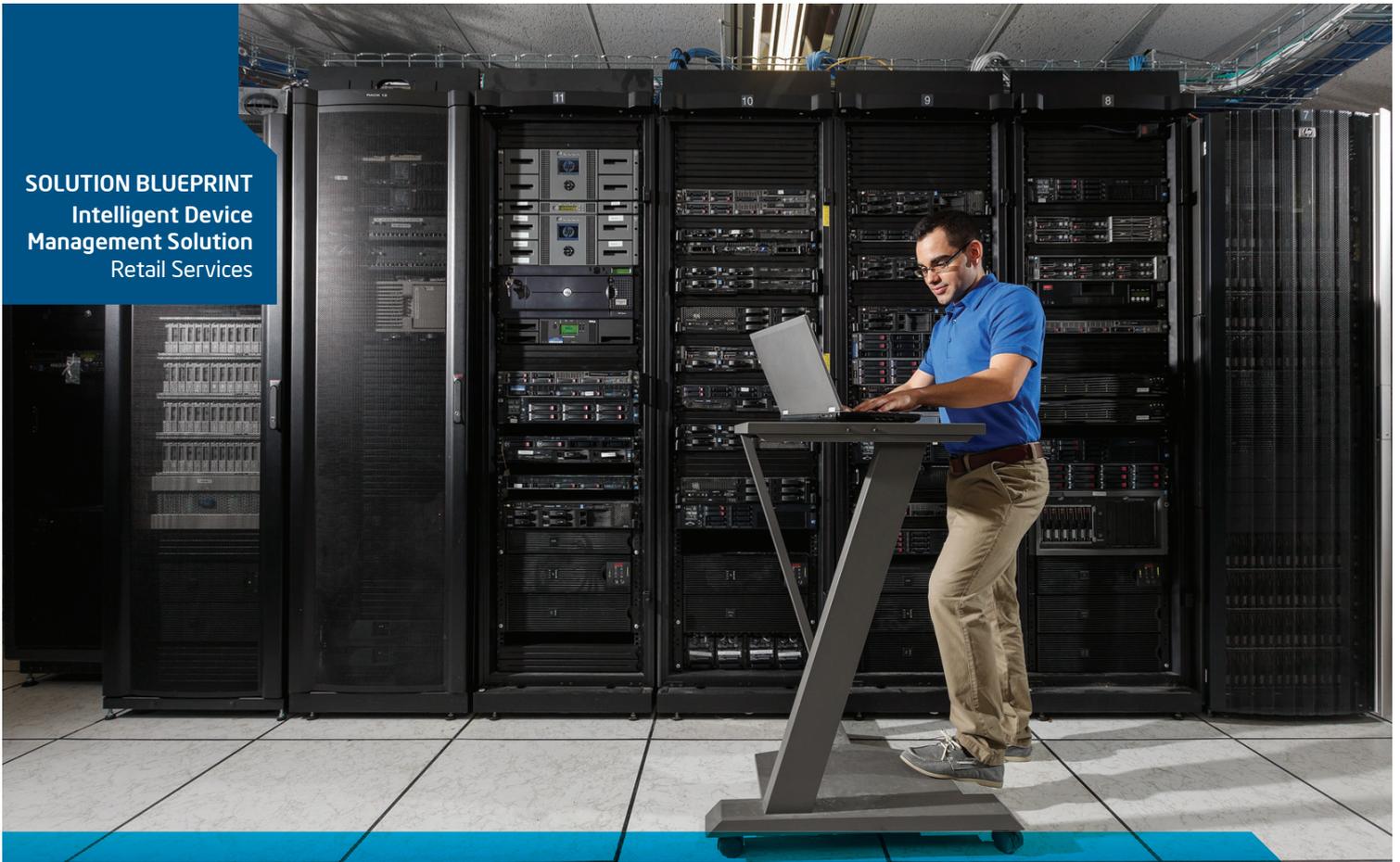


SOLUTION BLUEPRINT
Intelligent Device
Management Solution
Retail Services



INTELLIGENCE IN. AMAZING OUT.

Intelligent Device Management Solution Improves Retail System Manageability and Brand Engagement

EXECUTIVE SUMMARY

Consumers want a consistent, comfortable brand experience, whether they are checking out at your retail counter, looking at a sales promotion on a digital sign or using a kiosk to look up product information. One way to ensure that level of consistency is to deploy an end-to-end retail solution designed with manageability and networking interoperability in mind, making it easier to present uniform brand messaging that builds sales. This is possible using readily-available, off-the-shelf components and systems that are integrated into Intel's intelligent device management solution. In addition to effective brand promotion, this solution makes it more cost effective to manage devices, perform inventory management and collect anonymous data, such as the age and gender of shoppers, while maintaining high standards of privacy and security.



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KEY BUSINESS OBJECTIVES

Reduce the complexity of multichannel deployments, deliver a consistent brand experience and minimize the effort to manage different types of retail systems.

WHO WILL BENEFIT FROM THIS SOLUTION

The end-to-end retail solution reduces the infrastructure complexity of the retail environment, helping to enable a multichannel shopping experience and delivering unified retail system management.

Consumers can get the best of physical and online shopping, including new services made possible by joining the two channels together.

Retailers can reduce the complexity of multichannel deployments, deliver a consistent brand experience and minimize the effort to manage different types of retail systems. This cloud-ready solution also gives retailers the option to outsource IT support to a third party. Moreover, the solution seamlessly pushes content and applications across the network, allows retailers to link inventory and signage applications to more quickly move overstocked inventory and provides anonymous viewer analytics data used to maximize the effectiveness of digital signage.

Brands get quantitative data to optimize their digital signage campaigns, taking into account digital sign location, customer demographics and viewing statistics.

MEETING NEW MARKET DEMAND

The digital age is dramatically impacting the way consumers shop, and many brick and mortar retailers are working hard to get ahead of the curve. One goal is to create a seamless consumer experience that is more compelling than online-only by enabling a continuous flow of information across channels and touch points.¹ The digital age provides new avenues for brand optimization by creating new opportunities to increase brand awareness and establish 1:1 personal relationships with consumers. This requires retailers to revamp their infrastructure to support multiple networks (LAN, Wi-Fi* and 3G/4G) and communicate with new-to-retail devices, like smart phones and tablets for sales assistants.

Multichannel marketing also provides retailers an opportunity to optimize brand engagement by delivering a digitally-fueled experience that reinforces the store's image and reputation. For instance, stores can link physical and online shopping in ways that offer more value to time-starved shoppers, as in "buy online and pickup in-store." In addition, multichannel infrastructure enables real-time messaging to consumers, like promoting in-store specials for overstocked items that must be moved quickly, thus creating opportunities to improve the top-line.

THE BUSINESS CHALLENGE

For those brick-and-mortar retailers looking to create a multichannel shopping experience, the major challenge is supporting a wide range of devices, including POS terminals, self-service stations, digital signage, smart phones, tablets and the like. Complicating matters, many newer devices are wireless and require some effort to bridge to the traditional LAN environment. Increasing retail IT infrastructure complexity is creating some major issues, including:

- **Unwieldy Device Management:** Implementing a multichannel strategy requires the integration of many new types of devices, often sourced by different vendors. As a result, retail IT departments may be burdened by a hodgepodge of device management tools, which severely constrains productivity.
- **Back-End Systems Everywhere:** The number of back-end applications and point solutions (e.g., product inventory, security surveillance and content management) is growing, leading to server sprawl that takes extra effort to support.
- **Connectivity Breakdown:** In addition to the existing LAN, IT departments have to deploy and maintain wireless technologies, like Wi-Fi and 3G/4G, in order to communicate with a new breed of retail devices.

- **IT Overload:** Already stressed IT departments may not have the resources or expertise needed to deploy and maintain an increasingly complex network of retail systems.

In an effort to cater to the new digital shopper, some retailers have created multiple, independent sales channels (Internet, social, mobile, physical stores) in order to expand their share of the market. They now struggle to effectively operate these mostly siloed entities, each with separate business and management processes, applications and, most importantly, inventories.

Poor system integration can make keeping an accurate, corporate-wide inventory count more difficult, especially when transactions cannot move seamlessly across channels. This only magnifies a long-standing problem for retailers – that of inventory distortion – defined as 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. According to the IHL Group, this combined annual cost is estimated at \$818 billion, increasing by \$50 billion each year²

SOLUTION OVERVIEW

CompuCom and other solution providers working with Intel have developed solutions that simplify today's rather complex in-store infrastructure using readily-available, off-the-shelf components and systems. The solutions, which retailers can deploy straight away, create an interoperable network linking content management systems (CMS), digital signage, kiosks, tablets and smart phones, all managed by a single console located in the intelligent device management solution. It encompasses wired Ethernet, Wi-Fi and 3G/4G connectivity, and is easily extended to POS terminals, self-service stations and other retail systems based on Intel® architecture processors.

Underlying Technology

The solution demonstrates some of the capabilities of Intel® vPro™ technology, in particular the advanced remote management functions provided by Intel® Active Management Technology (Intel® AMT).³ This proven technology is integrated into many embedded Intel® processors and chipsets with the goal of driving lower system support costs and faster return on investment (ROI).

Intelligent Device Management Solution

Intel developed a fully functional intelligent device management solution that brings together the types of devices required to create a multichannel experience, as illustrated in Figure 1. This is a scalable solution that enables retailers to manage devices across multiple stores, countries and geographies from a centralized location. Details about the solution components are listed in Table 1, and an overview of the capabilities is provided in the following.

Server: The intelligent device management solution implements a server based on the Intel® Xeon® processors that can consolidate all in-store retail applications, including the following applications:

Management Console
The solution includes various systems that are managed by the EUC Workbench* supplied by CompuCom Systems*, Inc., a leading IT outsourcing specialist. The combination of Intel and CompuCom technologies allows service desk personnel to remotely manage and repair systems that formerly required

costly and time-consuming onsite visits by a technician. This solution makes it easier than ever for retailers to manage technology assets, protect sensitive data and neutralize lost or stolen devices.

Intel® Active Management Technology (Intel® AMT) features a Keyboard-Video-Mouse (KVM) Remote Control capability that allows technicians to control the system as if they're sitting right in front of it, even when the system is down.

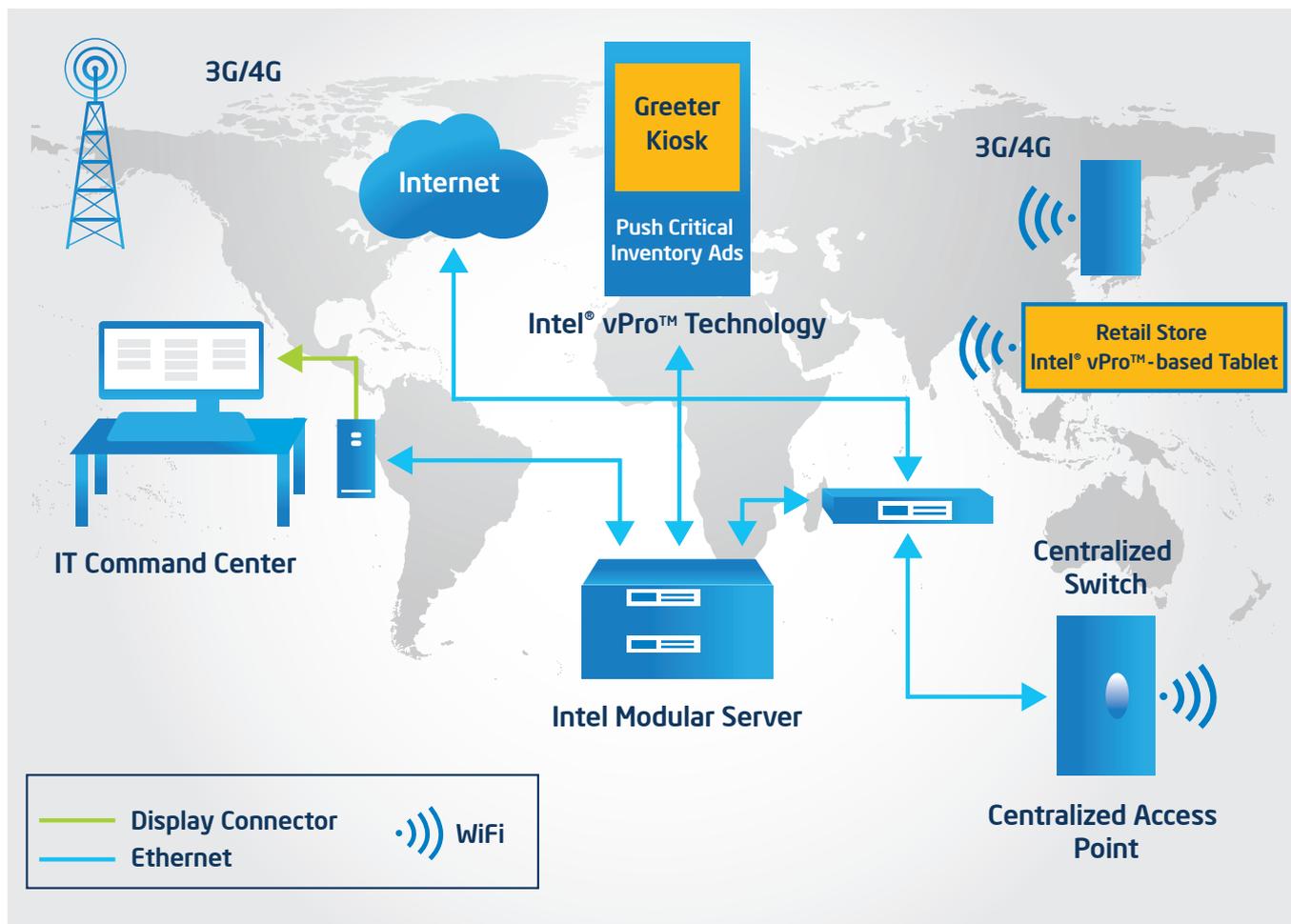


Figure 1. End-to-End Retail Solution Example Deployment

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Component	Hardware Specification	Software Specification	Connectivity
Server	Four server compute modules based on the Intel® Xeon® processor	Operating System: <ul style="list-style-type: none"> Servers 1-3: Microsoft* Windows* Server 2008 64 R2, 16MB RAM Server 4: Microsoft Windows 7 64 Pro, 16MB RAM Applications: <ul style="list-style-type: none"> Server 1: CMS Toolset Server 2: CompuCom* EUC Workbench and infrastructure (DHCP, DNS, AD, IIS, SCS, SCCM) Server 3: Intel® AIM Suite Server 4: CompuCom Device Management Console Security Software: <ul style="list-style-type: none"> McAfee* ePolicy Orchestrator* (McAfee* ePO) Deep Command* McAfee* Embedded Control McAfee* Deep Defender 	Ethernet
Greeter Kiosk	Intel® vPro™ technology-enabled media player based on the Intel® Core™ processor	CMS Toolset Operating System: Microsoft Windows 7 Intel AIM Suite Security Software: <ul style="list-style-type: none"> McAfee ePO Deep Command McAfee Embedded Control McAfee Deep Defender 	Ethernet
Digital Signage	Intel® vPro™ technology-enabled media player based on the Intel® Core™ processor	CMS Toolset Operating System: Microsoft Windows 7 Intel AIM Suite Security Software: <ul style="list-style-type: none"> McAfee ePO Deep Command McAfee Embedded Control McAfee Deep Defender 	Ethernet
Tablet	Intel® vPro™ technology-enabled Fujitsu* tablet based on the Intel® Core™ processor	Operating System: Microsoft Windows 8 Security Software: <ul style="list-style-type: none"> McAfee ePO Deep Command McAfee Embedded Control McAfee Deep Defender 	Wi-Fi*
Smart Phone	Intel® Atom™ processor	Android Application CompuCom Device Management Software	3G and Wi-Fi
Wi-Fi Router	N/A	N/A	N/A
Screen 1	46-inch	Display EUC Workbench Tool	VGA
Screen 2	46-inch	Used to Display the EUC Workbench Tool	VGA
Screen 3	46-inch	Display AIM Suite	VGA

Table 1. Intelligent Device Management Solution: Component Details

Content Management Server (CMS)

The CMS stores the media content (e.g., advertisements and general store information) played on kiosks and creates their playlist based on business rules created by retailers. The CMS also pushes applications to the tablets, such as an App used by sales associates to check inventory.

Anonymous Viewer Analytics

Retailers can learn more about the demographics of their customers with the help of powerful data collection and audience measurement tools provided by the Intel® Audience Impression Metrics Suite (Intel® AIM Suite). The software processes video input from optical sensors in order to anonymously determine the characteristics of those in front of the sign.

Intel AIM Suite provides valuable metrics that were previously unavailable to retailers and brands, allowing them to better understand audience characteristics such as actual impressions, length of impressions, potential audience size, and gender and age range demographics. These metrics can help marketers determine the best locations for displays, tailor screen content based on audience characteristics and understand audience engagement levels.

Intel AIM Suite enables marketers to objectively measure advertising effectiveness – information that can be used to identify actionable steps to boost their ROI.

Greeter Kiosk and Digital Signage Display:

The displays play welcome messages and promote products, including overstocked items that must be moved quickly. The displays are driven by Intel vPro technology-enabled media players that also run Intel AIM Suite software on video streams captured by an optical sensor.

Tablet: Sales associates use the tablet to show customers product information and help them make product decisions based on their preferences. Tablets from Fujitsu* integrate Intel vPro technology.

Smart phone: An Intel® Atom™ processor-based smart phone gives sales associates mobile access to retail applications and the Internet.

Wi-Fi Router: The router connects tablets and smart phones to the Internet and the in-store wireless network.

Screens 1-3: Three screens in the intelligent device management solution are managed by the applications running on the Intel Modular Server. Applications can be invoked on the screen to monitor or manage devices or even push digital content to the devices.

This end-to-end retail solution helps address several challenges facing retailers and their IT departments by:

▪ **Enabling centralized device management based on Intel processors.**

> Today, IT departments can use a single device management console to remotely fix many software issues on servers, POS terminals, kiosks and digital signage, thereby reducing the number of expensive on-site service calls. For example, Vodafone* reported Intel vPro technology allows them to remotely diagnose and resolve 99 percent of their software issues on a network of more than 4,200 digital signage systems.⁴

▪ **Consolidating all retail back-end solutions onto one server.**

> This all-in-one server rack allows IT departments to run their applications on a single system, which lowers energy costs, reduces support effort and facilitates failover via virtualization.

▪ **Providing an end-to-end solution that addresses wired and wireless connectivity.**

> IT departments can use off-the-shelf hardware and software components to quickly deploy wired Ethernet, Wi-Fi and 3G/4G networks for communications, content pushing and advanced device management.

▪ **Allowing retailers to outsource device and content management services.**

> Retailers can avoid burdening their internal IT departments by contracting cloud-based third-party IT specialists.

TECHNOLOGY

Intel® vPro™ Technology

When an embedded device has Intel vPro technology, it incorporates a number of Intel technologies, including:

- Intel Active Management Technology (Intel AMT)
 - offers breakthrough remote management and energy saving capabilities
- Intel® Trusted Execution Technology (Intel® TXT)⁵
 - supplies additional security protection over software solutions
- Intel® Virtualization Technology (Intel® VT)⁶
 - improves the efficiency and security of virtualized environments

Together these technologies deliver unprecedented hardware support for advanced management functions, comprehensive security protection and software integration - enabling solutions that are reliable, trusted and cost-effective. Furthermore, every embedded device that advertises the Intel vPro technology name has been validated by a test suite developed by Intel.

Intel® AMT Spotlight

Taking remote management to a new level, Intel AMT allows consoles to fix a wider range of systems issues, even when the operating system is down. For example, it's possible to repair corrupted drivers, application software or the operating system for a non-responsive retail system that won't run or boot. This can be done on an Intel vPro technology-enabled system through a capability called out-of-band (OOB) management, which works over Ethernet, Wi-Fi and 3G/4G networks.

EMPOWERING A NEW WORLD OF RETAIL INNOVATION

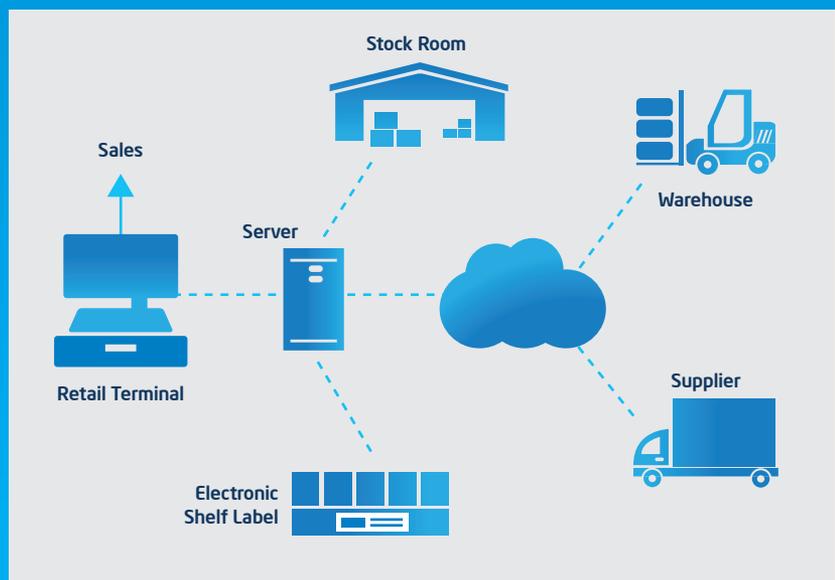
The retail industry is in the midst of a dramatic information revolution that is laying the groundwork for new consumer experiences, enhanced productivity, reduced inventory distortion and brand optimization. Intel is addressing this transformation with the Intel® Intelligent Systems Framework, a set of interoperable solutions designed to facilitate connecting, managing and securing devices in a consistent and scalable manner.

What can emerging intelligent retail systems do? Imagine an intelligent store where incoming weather data indicates a severe storm approaching. The store's digital signs and kiosks immediately begin promoting items commonly purchased during storms, like umbrellas, and prices are adjusted to reflect the predicted increase

in demand. Price updates are transmitted to electronic shelf labels and the back office. Data from checkout confirms umbrella sales are increasing, causing immediate alerts to the stockroom. The store's warehouses and key suppliers send shipments to replenish the shelves.

The Intel Intelligent Systems Framework helps simplify the deployment of intelligent systems and enables retail OEMs to shift their investments from achieving interoperability to unlocking the value of data. The framework features fundamental capabilities, delivered by components that address connectivity, manageability and security, including software and middleware from Wind River* and McAfee*.

For more information, visit www.intel.com/content/www/us/en/embedded/intelligent-systems.html.



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This out-of-band link employs a dedicated manageability engine, which enables control over non-functioning systems. In contrast, most traditional remote management consoles use an in-band link that requires the system to perform networking functions – in other words, have a working operating system, CPU and network drivers. When a system fails, the in-band approach has the drawback of relying on the continued operation of many system components, significantly limiting the types of problems or failures that can be fixed remotely.

Comprehensive System Protection

Business-critical or customer-confidential information can fall into the wrong hands if the data on retail systems is not properly safeguarded. McAfee offers several products that provide multiple layers of protection against data loss and unauthorized access.

Centrally Managed Security

For retail IT departments tasked with securing a large number of retail systems dispersed across geographies and connected to various networks, security management can be overwhelming. This is made easier by centralizing all the necessary support functions, achievable with McAfee* ePolicy Orchestrator* (McAfee* ePO) Deep Command* software designed to unify the management of endpoints, networks, data, and compliance solutions. Used on nearly 60 million nodes worldwide, the software increases overall visibility across security management activities, thereby improving protection and enabling IT to achieve dramatic efficiencies.

McAfee ePO Deep Command also employs Intel AMT to remotely manage computer-based systems and to reduce the number of expensive onsite visits required to address security incidents or fix equipment. Security administrators can remotely deploy, manage and update

security and device software on disabled or powered-off retail systems. This is possible because Intel AMT establishes an out-of-band connection to the retail system that allows utility IT departments to take control of the device – even, potentially, a rogue device – regardless of the hardware or software state. Using Intel AMT (Figure 2), the device can be taken offline, cleansed remotely by reloading its software image and then brought back online.

Malware Protection

Most computer-based retail systems are protected by anti-virus (AV) software, the traditional security approach that blocks, and often eradicates, malicious code or data. The software looks for known or suspicious character strings that are documented in regularly updated malware signature files. A lesser known, lightweight alternative, called application whitelisting, ensures only authorized, trusted software (i.e., whitelist) is permitted to execute; and conversely, unknown and malicious code is blocked without requiring signature files. Whitelisting is particularly effective and efficient for fixed function devices, like POS terminals, ATMs and kiosks, which generally run a pre-defined set of applications.

McAfee* Embedded Control automatically creates a dynamic whitelist of the “authorized code” on the device. Once the whitelist is created and enabled, the system is locked down to the known good baseline. No program or code outside the authorized set can run, and no unauthorized changes can be made. When untrusted software attempts to execute, an alert is sent to the management console, prompting potential corrective action.

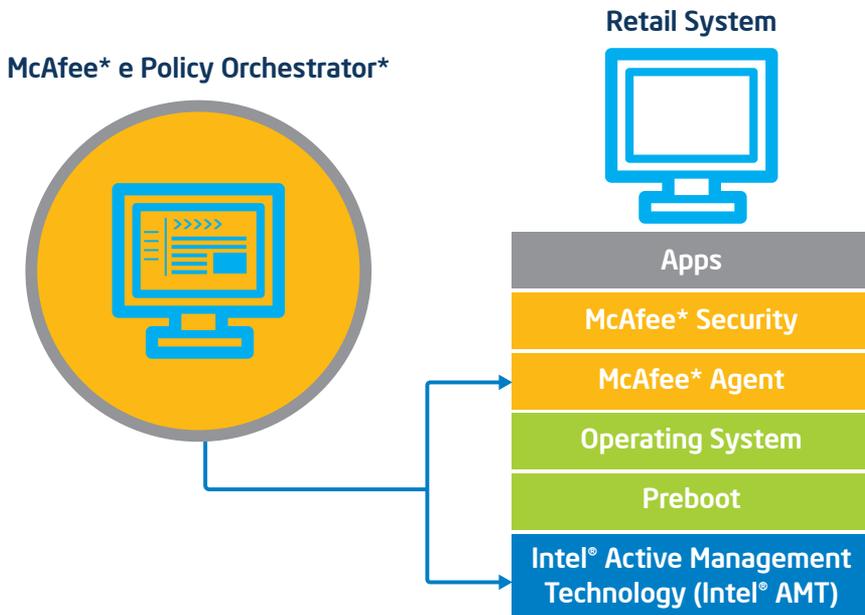


Figure 2. McAfee* ePO* Deep Command* with Intel® AMT

Covert Threat Protection

Stealthy malware has become a cybercrime tool of choice, with more and more new and unknown malware using cloaking techniques such as rootkits. Criminals rely on this low-level code to evade operating system-based protections. McAfee and Intel have teamed up to defeat these attacks with hardware-enabled protection (Intel VT) that operates between the CPU and the OS, protecting components that reside in physical memory. McAfee* Deep Defender makes it easy to extend system security beyond the operating system to preempt covert zero-day threats. The solution reveals and removes advanced, invisible attacks by performing behavioral monitoring of real-time kernel operations.

For retailers looking for assistance in deploying the capabilities discussed in this solution blueprint, the Intel® Retail Solutions Partner Network comprises industry-leading vendors with expertise in many key areas, including hardware, software, content creation, deployment and networking.

SUMMARY

CompuCom and other solution providers working with Intel have developed solutions that enable retailers to remotely manage various retail systems across Ethernet, Wi-Fi and 3G/4G networks using readily-available, off-the-shelf components. In addition to reducing retail infrastructure complexity, the solution provides seamless connectivity and supports content management, which enables retailers to better manage inventory information across systems and increase brand engagement with customers. Retail systems based on Intel vPro technology and Intel® processors simplify the implementation of a multichannel strategy by supporting secure, unified device management across wired and wireless networks.

RESOURCES

Intel® Retail Solutions Partner Network

Redefining what's possible, leading solution providers have come together to address the specific needs of retailers, whether it's consulting, content creation and management, retail systems, hardware customization, deployment support, network management or cloud-based services. The Intel® Retail Solutions Partner Network provides one-stop

shopping for cutting-edge technologies that deliver new consumer experiences, enhanced productivity, reduced inventory distortion, brand optimization and more. To learn more, visit intel.com/retailsolutions.

To learn more about CompuCom and Intel vPro Technology, visit www.compucom.com/intel.

For more information about tablets from Fujitsu, visit <http://www.shopfujitsu.com/store>.

For more information about Intel AIM Suite, visit <https://aimsuite.intel.com>.

For more information about security solutions from McAfee, visit www.mcafee.com.

¹ Source: "Omni-Channel 2012: Cross-Channel Comes of Age", Retail Systems Research, p. 7. <http://www.rsresearch.com/2012/06/12/omni-channel-2012-cross-channel-comes-of-age>.

² IHL Group Report: \$818 Billion Lost Annually in Global Retail "Inventory Distortion"; 2012.

³ Intel® Active Management Technology (Intel® AMT) requires the platform to have an Intel AMT-enabled chipset, network hardware and software, as well as connection with a power source and a corporate network connection. With regards to notebooks, Intel AMT may not be available or certain capabilities may be limited over a host OS-based VPN or when connecting wirelessly, on battery power, sleeping, hibernating or powered off. For more information, see <http://www.intel.com/technology/manage/iamt>.

⁴ Source: "Lowering Operating Cost for Digital Signage" at <http://edc.intel.com/Link.aspx?id=4213>.

⁵ No computer system can provide absolute security under all conditions. Intel® Trusted Execution Technology (Intel® TXT) requires a computer system with Intel® Virtualization Technology (Intel® VT), an Intel TXT-enabled processor, chipset, BIOS, Authenticated Code Modules and an Intel TXT-compatible measured launched environment (MLE). The MLE could consist of a virtual machine monitor, an OS or an application. In addition, Intel TXT requires the system to contain a TPM v1.2, as defined by the Trusted Computing Group and specific software for some uses. For more information, see <http://www.intel.com/technology/security>.

⁶ Intel® Virtualization Technology (Intel® VT) requires a computer system with an enabled Intel® processor, BIOS, virtual machine monitor (VMM), and for some uses, certain platform software enabled for it. Functionality, performance, or other benefits will vary depending on hardware and software configurations and may require a BIOS update. Software applications may not be compatible with all operating systems. Please check with your application vendor.

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