

SOLUTION BLUEPRINT
Intelligent Mobile
Advertising
Retail Services



INTELLIGENCE IN. AMAZING OUT.

Intelligent Mobile Advertising Solution Delivers Targeted Messages

EXECUTIVE SUMMARY

In many ways, consumers are way ahead of brands and retailers with respect to using digital technologies in the retail space. They have access to an abundance of information—anytime, anywhere—thanks to technology that allows them to download detailed product information, read online reviews, text friends for opinions, compare prices and more. On the other hand, many brick-and-mortar stores have embraced the digital age more slowly, a factor contributing to the loss of market share to online shopping.

Developing a comprehensive marketing strategy to take advantage of the rise of smart phones, social media, web content or other digital channels is non-trivial. With change comes opportunity, one of which is building and sustaining 1:1 personal relationships with every single customer. This can be achieved with an intelligent mobile advertising solution that integrates—in an end-to-end manner—multiple digital channels, as well as data mining and digital signage. This solution blueprint discusses a scalable and extensible framework capable of interacting with customers more intelligently by combining information from a wide variety of sources.



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KEY BUSINESS OBJECTIVES

Improving ad targeting by coalescing mobile and web data, social media, data mining, couponing and digital signage.

WHO WILL BENEFIT FROM THIS SOLUTION

The intelligent mobile advertising solution integrates content from various channels in a way that benefits both consumers and companies seeking their business.

Consumers can get information tailored to their personal likes, buying habits and current interests, allowing them to shop more efficiently and perhaps learn about offers they might otherwise miss.

Retailers can create a more informative and productive shopping experience, thereby attracting more traffic to their physical stores and company web sites.

Brands can learn more about advertising effectiveness with respect to digital sign location, customer demographics and viewing statistics, enabling the fine-tuning of marketing campaigns based on quantitative data.

Media Companies can demonstrate the effectiveness of digital signage by location, thus paving the way for data-driven, tiered pricing models or ad time auction sites, both of which can help increase margins.

MEETING NEW MARKET DEMAND

Everyone carries around a lot of data on their cell phones, from the locations they visited to what they like best, as expressed with social media. Data about personal likes and buying habits is valuable when targeting advertising to individual consumers, achieved with the intelligent mobile advertising solution. It combines anonymous gender recognition and other data collection technology built into today's latest digital signs with information from smart phones. Once it is collected and analyzed in a way that protects individual privacy, a special content management server uses the data to select targeted and powerful brand messages, tailored to the preferences of the individual consumer.

THE BUSINESS CHALLENGE

Winning the hearts and minds of consumers is essential and can be achieved by overcoming this set of challenges facing retailers, brands and media companies:

▪ Merge digital and physical worlds:

The goal is to create one seamless experience for consumers that is more compelling than online-only by enabling a continuous flow of information across channels and touch points.¹

The number of ways to touch consumers is growing. First, there was a visit to a brick-and-mortar store, then online, followed by social media and now, mobile devices. There are few similarities between them since they use different technologies, applications, processes and business practices, which complicate efforts to combine the digital and physical worlds into one. Moreover, these channels emerged over time and multiple generations of retail systems; as a result, most installed retail systems weren't designed to process and share all the different types of information.

- **Personalize the shopping experience:** Consumers continue to ignore advertisements that don't interest them.

A recent report published by Pew Research surveyed Internet users and found 68 percent were "not okay" with targeted advertising because they don't like having their online behavior tracked and analyzed.² However, many consumers are willing to "opt in" to new services that provide useful information, such as coupons of interest, product reviews, directions and so on. The challenge for the retail industry is to make sure their personalized contact with consumers is timely and appropriate, and doesn't come across as an irritating barrage of inconsequential information.

- **Measure advertising effectiveness:** The age-old problem for marketers is gauging the effectiveness of an advertising campaign, sometimes measured by the return on investment (ROI) generated by increased sales.

Digital signs represent a growing advertising medium, offering many advantages over traditional billboards and posters in the retail environment, such as greater viewership and real-time content updating. Added to these advantages is the ability of some signs to obtain reliable metrics on viewers, including impression counts, time of day, duration and the viewer's gender and age bracket.

This information, collected using facial detection Anonymous Viewer Analytics (AVA) technology, allows brands and retailers to tailor advertising content based on audience behavior and characteristics, helping to show the right message to the right people at the right time. For a report on an Anonymous Viewer Analytics field trial at the Venetian in Las Vegas, download edc.intel.com/Linkaspx?id=4832&wapkw=venetian.

- **Don't fall behind:** With market share losses to online shopping mounting, it's critical for brick-and-mortar stores to step up their game so as to preserve their brand image and remain relevant to consumers.

Many retailers are scrambling to understand how to greatly enhance the shopping experience with digital technologies and get a competitive advantage, not the least of which is online shopping web sites. The digital age has put consumers in the driver's seat, giving them multiple channels (mobile, online, in-store) to engage with and buy from. It's time for retailers to get immersed in the latest technologies and think about what's possible, or else miss the opportunity to engage a new generation of tech-savvy consumers.

SOLUTION OVERVIEW

Engineers at Intel developed an intelligent mobile advertising solution that uses a number of channels to deliver targeted messages to consumers. There are limitless ways this solution can be used to connect with customers, but the following provides representative scenarios that are tied together, as shown in Figure 1. All scenarios require the consent of the consumers, and private information is safeguarded because it never leaves the consumer's mobile device.

Target Messaging Capabilities

This example considers ways to reach new home buyers, who typically need to shop for a wide variety of products and services, such as mortgages, furniture, appliances, paint, landscaping and security systems, just to name a few. Consequently, banks, various retail stores, landscapers, and so on, are eager to get their message out to this demographic.

- **Opt in:** A couple decides to buy a new home, and they go to a Home and Garden show to get some decorating ideas. At the show, a home security vendor offers free installation to anyone who downloads an application (app) to their smart phone. Impressed with the vendor's product, the couple "opts in" to the service to possibly redeem the promotion at a later date. Subsequently, an app is downloaded onto their phones, along with the vendor's contact information, web address and promotional coupon.

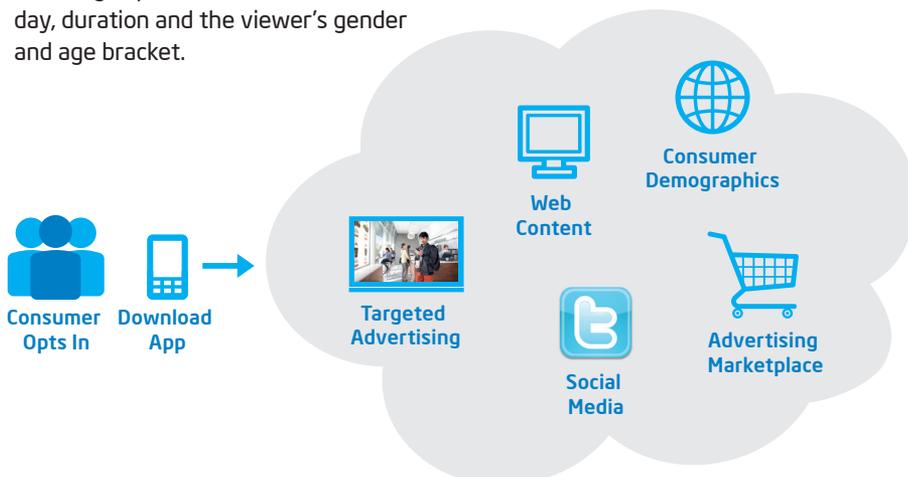


Figure 1. Representative Scenarios of Target Messaging Capabilities

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- **Targeted advertising:** A week later, the couple visits a home improvement store, where there is a digital signage display in the main corridor. As they approach, the sign plays an ad from the home security vendor they saw the week before. The next ad to play is for the bank where the couple inquired about a new home mortgage a few days ago. More than a coincidence, the intelligent mobile advertising solution can track the whereabouts of consumers and show them content of interest on a network of digital signs.
- **Social media:** There's a tweet about a new furniture store opening in the neighborhood where the couple lives, and it is offering a 10 percent discount on new bedroom sets. The tweet is forwarded to the couple by the solution.
- **Web content:** The intelligent mobile advertising solution searches the Web for content of interest to new home buyers, like mortgage rates, security system reviews and specials at appliance stores. Timely information is sent to the couple at the right time, such as when they walk into a major department store, a discount coupon for a new refrigerator is sent to their phones.
- **Advertising marketplace:** Some digital signs secure Anonymous Viewer Analytics data, which can be made available to media companies and brands to help them decide when to advertise. For example, the digital sign sends the following data to the cloud: at 3pm on Saturdays, 75 percent of viewers are young males and their average dwell time is 6 seconds for car advertisements, 10 seconds for fast food and 2 seconds for other ads. With this information, a food store in the mall's food court

buys advertising slots from 2 to 4pm using an auction site sponsored by a media company.

- **Consumer demographics:** The new home buyers go to the shopping mall at dinner time, and there's a digital sign in the main hall. The sign sees the couple walking nearby, and it plays an ad for a sit-down restaurant in the mall. If a young male had walked up instead, the sign may have played an advertisement for hamburgers and fries in the food court.

This intelligent mobile advertising solution helps address several challenges facing retailers, brands and media companies today by:

- Enhancing the in-store experience with intelligent connectivity to smart phones, the Internet, social media and up-and-coming digital technologies.
 - > Stores can be an extension of the multi-channel world consumers have grown accustomed to, enabling them to shop the way they want.
- Personalizing the shopping experience by delivering targeted advertising based on personal likes, buying habits and current projects (e.g., shopping for a mortgage).
 - > Consumers receive personally relevant information, making them aware of offers they're interested in and more likely to buy.
- Measuring the effectiveness of advertising playing on digital signage.
 - > AVA generates key statistics used to gauge the consumer response to ads, such as how many people looked at the advertising, how long they watched and their demographics.

- Staying ahead of the curve with scalable and extensible cloud-based technology.
 - > As technology continues to evolve, retailers can rest easy knowing cloud-based solutions will keep pace and not require them to continuously upgrade their systems.

Respect for Privacy

The intelligent mobile advertising solution respects consumers' privacy and gives them control over the level of interaction.

- **Consumer data protection:** All the mobile data is mined locally on the mobile device, and none of the consumer's actual data leaves the phone. Only word vectors, like a new house, bike and boat, are sent out.
- **Voluntary participation:** Consumers must provide permission to initiate the service. At any time, they can withdraw from the program and terminate all information sharing.
- **Generalized data aggregation:** Word vectors are aggregated from the perspective of age/gender/city. This high level of element aggregation is general, and it does not target individuals.
- **Approximate location tracking:** The solution can detect whether a consumer of a targeted demographic is in the vicinity of a digital sign, but not exactly who he/she is. For example, the solution knows that a young adult male may be passing by, and there's a chance that if a speed boat ad plays, he'll see it.

TECHNOLOGY

Figure 2 shows a simplified block diagram of the intelligent mobile advertising solution major architectural components, which are described in the following:

Mobile device: The first step is for consumers to “opt in” to a service offered by a retailer or brand, typically in response to a special promotion, like a coupon or giveaway. Next, an app is downloaded to their mobile device and “locally” mines information on the device, like GPS coordinates, call logs and browser history, all while maintaining privacy. The mined information is generalized and sent to the solution’s mobile data server in the cloud, such that all personal information (e.g., name, address or contact list) never leaves the device.

Mobile data server: This server receives mined anonymized data (word vectors) from consumers’ phones and analyzes it, consolidating data from thousands of sources, anonymizing it further, and creating profiles based on age/gender and city. From these profiles, it’s possible to identify behavioral trends, which encompass location, physical activity, browsing preferences, etc. The server sends the output of its analysis to the content management system (CMS) server.

Social media crawler: Historic and real-time Twitter* feeds are filtered by supervised-learning algorithms, and the top trends are sent to the web crawler.

Web crawler: Taking in mobile data, the web crawler performs data mining to find

data that’s pertinent to opt-in consumers, such as product reviews and special offers. It also receives the top trends from the social media crawler and sends best-match content, based on consumer preferences, age range and location, to the business rules server.

Business rules server: After receiving mined data that’s been correlated to specific consumers, this server determines where and when to play targeted advertisements on digital signs in the network. It creates business rules, one of which may be to play an advertisement for laptop computers at a mall in the vicinity of a consumer who recently browsed the web sites of the leading PC manufacturers. The business rules are sent to the CMS for processing.

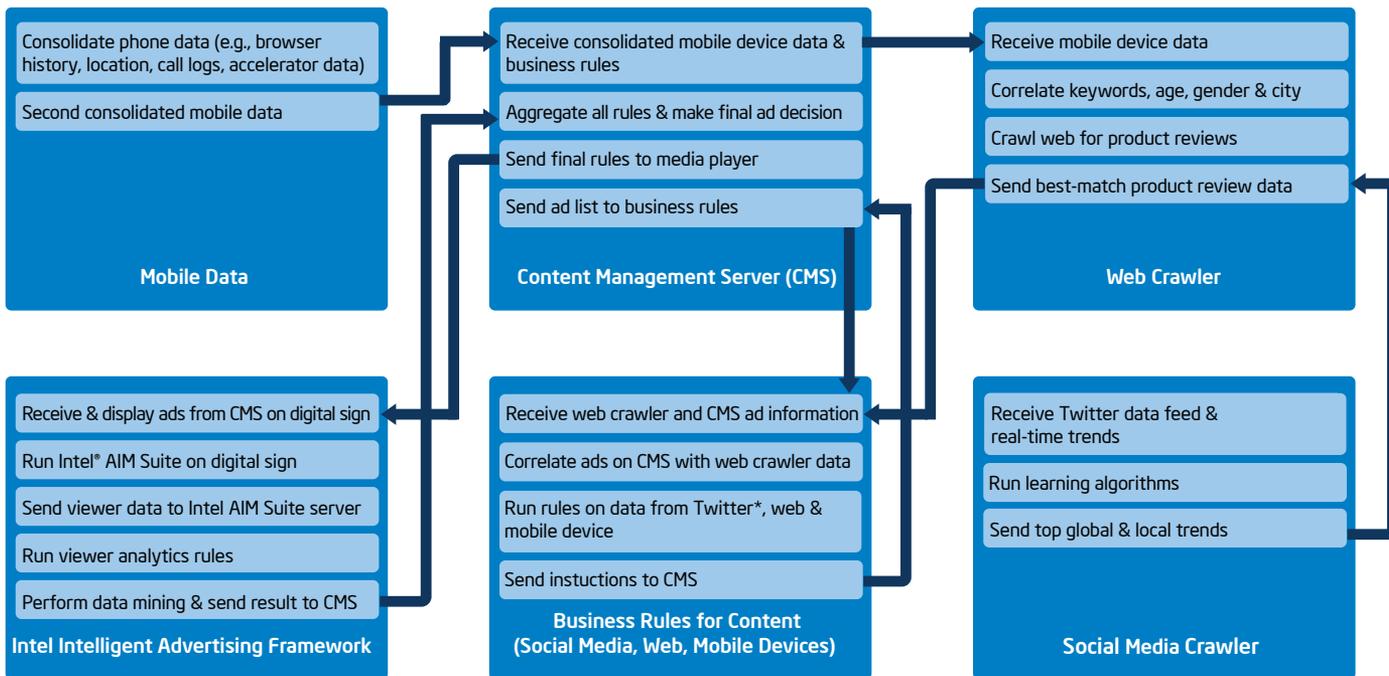


Figure 2. Simplified Architectural Block Diagram

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Intel intelligent advertising framework:

This cloud-based service schedules advertisements on digital signs as instructed by the CMS. The digital signs execute Intel® Audience Impression Metrics Suite (Intel® AIM Suite) to collect anonymous information on viewers, such as their age range, gender and dwell time. This information is filtered and sent to the CMS.

Content management system

(CMS) server: The server is the hub of the solution, managing the traffic flow between the various system components in the solution. It stores the advertisements and instructs the digital signs to play them based on business rules created after considering relevant mobile data, social media, web content and, of course, input from retailers and/or media companies.

Implementation Information

The application software can connect to back-end systems, and it doesn't have to be set up on the CMS. The intelligent mobile advertising solution is a component, which could be integrated by numerous systems integrators. It is a complete end-to-end-reference design available from Intel.

Anonymous Viewer Analytics (AVA)

Intel AIM Suite adds powerful data collection and audience measurement

tools to a digital signage network. By providing valuable metrics that were previously unavailable, retailers, brands and media companies can 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.

Hardware Platform

- Media players (connected to digital signs): 3rd generation Intel® Core™ processor-based computers.
- Servers in the cloud: Intel® Xeon® processor-based.

Intelligent Mobile Advertising Solution Software:

It is currently a reference design for media players, Android* phones, web and social media crawler servers, and content management server. Please contact your Intel business development manager to get the reference design.

A) Software components for media players

- Operating system: Microsoft* Windows* 7
- Security: McAfee* Endpoint Encryption and McAfee* Device Control
- Applications: Intel AIM Suite – Intel supplied

B) Software components for Intel® Intelligent Systems Framework-based devices

- Operating system: Android
- Application: Downloadable mobile phone application – Intel supplied

C) Software components for web crawler and social media crawler servers

- Operating system: Microsoft Windows or Linux*
- Application: Data mining service in the cloud – Intel supplied

D) Software components for content management server

- Application: content management server in the cloud – Intel supplied

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.

EMPOWERING A NEW WORLD OF RETAIL INNOVATION

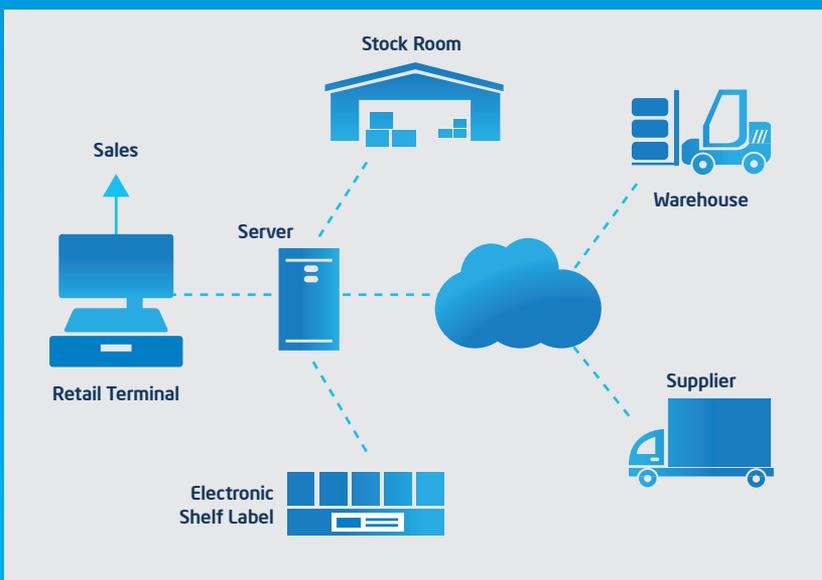
The retail industry is in the midst of a dramatic information revolution that is laying the groundwork for new consumer experiences, enhanced productivity, reduced inventory distortion and brand optimization. Intel is addressing this transformation with the Intel® Intelligent Systems Framework, a set 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.



SUMMARY

Intel developed the intelligent mobile advertising solution to provide a framework for retailers and media companies who want to deliver real-time targeted messaging to consumers using information available in the vast digital world. The solution can be used to create a unique shopping experience that combines the best of digital and physical worlds, thus creating a competitive advantage. Consumers are presented with personalized messages whose effectiveness can be measured using Intel AIM Suite with its Anonymous Viewer Analytics (AVA) technology. Moreover, the solution is cloud-based, providing the flexibility, scalability and extendibility to support a new age of mobile advertising.

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.

¹ "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 Source: "Search Engine Use 2012 – Pew Internet & American Life," by Kristen Purcell, Joanna Brenner and Lee Rainie of Pew Research <http://pewinternet.org/Reports/2012/Search-Engine-Use-2012.aspx>.

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