Executive Summary
Digital signage is a new and rapidly growing communications medium that offers a wide range of exciting ways to engage with customers, enhance brand awareness, increase sales and margin uplift and much more.

This guide takes you through the basics that are critical to the success of any digital signage project.

How To Use This Guide
Our goal with this guide is to provide you with an introduction to the key questions and decision areas that need to be addressed in order to fully realize your investment in this new medium.

Here you will find basic information about establishing objectives, creating content, choosing hardware and software and managing your digital signage solution.

No two situations are exactly the same. And it’s unlikely that even two organizations with the same needs will follow exactly the same approach.

Also, digital signage technology is rapidly evolving. The vendors in the digital signage industry are constantly developing new solutions that take advantage of the latest display technologies, multi-core processors and wireless networks. New media options and opportunities for 1:1 interaction arise all of the time.

For all of these reasons, this guide doesn’t provide explicit deployment directions or give recommendations on specific solutions from individual companies.

It provides a practical, holistic overview so you can see the critical decision points in context. The information provided here, along with the examples of digital signage in action, checklists and links to other sources, will provide a firm foundation as you begin to explore how you can take advantage of this powerful new medium.
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### Introduction: A Powerful New Communications Medium

Walk into any store, hotel, airport, school, movie theatre, health club—you name it—and it’s likely you will encounter a digital display that is advertising a product, promoting a brand, providing you with directions or even inviting you to step up and interact. Welcome to the world of digital signage—a major new communications medium for reaching people wherever they are: shopping, traveling, going to school and more.

Retailers have led the way in digital signage. With the right screens in the right places showing the right content, digital signs enhance the in-store experience and deliver on the bottom line, providing a way to showcase hot new inventory, promote closeouts and give shoppers the new ideas that drive sales. (For some interesting examples of how digital signs are being used in retail today, see Section One: Digital Signage in Action.)

But retailers are just one example of the digital signage revolution:

- In transportation centers—airports, train stations, subways—digital signs keep travelers on schedule while also displaying revenue-producing advertising.
- In schools and on college campuses, digital signs are the new channel for communicating with students, replacing printed calendars and bulletin boards; they also play a role in the all-important emergency alerting system.
- In high-volume, quick-service restaurants, digital signs help streamline the ordering process and offer customers a way to interact via their smartphones.
- In hotels and resorts, digital signage is an easy and flexible way to provide guests with information about services and activities on and off the property—information that drives greater use of these services and delivers on the bottom line.

As you can tell from these examples, digital signage offers significant advantages over conventional signage and posters, which have to be designed and printed well in advance. With digital signage you can adapt messaging on the fly. Different content can appear on different screens at different times and different places. You can also have live feeds from TV, the Web, databases and more.

While this dynamic flexibility is a huge advantage, if you think of digital signs as simply a replacement for posters and billboards, you are making a mistake.

- They are not just signs. You can embed a display into almost anything: a vending machine, a pump at the gas/petrol station, an elevator, etc.
- Digital signs are for more than just a one-way flow of information. People can interact with signs via touch screens, gestures or mobile devices.
- Digital signs are smart—with the addition of a sensor on the sign you can gather anonymous audience analytics: track how many people viewed the sign, their age, gender, etc. You can use this information for product placement and store design. You can even change the content that appears on the sign based on the demographic of the person.
- Digital signage is so pervasive; it is looked upon as a new medium, often referred to as the “fifth screen” (after film, TV, the PC and the mobile device). In fact, many organizations that have digital signs have chosen to accept third-party advertising on them, creating another revenue stream.
1. Digital Signage in Action

Digital signage has come a long way in just a few years.

The first digital signage solutions began to appear in the 1990s. The original installations typically consisted of bulky CRT displays running content off of a videocassette or, later, a DVD. The flow of information to viewers was one way (no interactivity). The content was often repurposed from other media (i.e., TV) and it played over and over. There was little or no capability to tailor content to specific audiences or measure the size or demographics of audiences.

Today’s digital signage solutions take advantage of new display technologies, high-powered, multicore processors, HD video, broadband networks, perceptual computing (interactions via voice or gesture) and more.

Here are just a few examples that provide a compelling look at how digital signage solutions are being implemented today. In each case, the design and implementation of the digital signage solution addressed specific marketing challenges, from branding to managing geographical diversity. How can you apply the thinking behind these examples in your business?

Burberry: Creating the Online Experience in Bricks and Mortar

Retailers have been struggling for years to come up with innovative ways of duplicating the online experience inside the store. Burberry has taken the message to heart.

Burberry is using digital signage to transform its branch at 121 Regent Street in London into a bricks and mortar manifestation of its website.

The store includes huge screens and hundreds of hidden speakers for a true surround sound experience. Interactive mirrors turn into personalized displays: clothing is tagged with chips that can be read by the mirrors and displays using radio-frequency identification technology. When a customer walks into a changing room holding a jacket, one of the mirrors might respond by turning into a screen showing images of how it can be worn or details on how it was made.

Adding to the experience is a network of high-speed lifts concealed behind restored paneling so that shoppers, accustomed to knowing in the space of a click whether an item is available, don’t have to wait for a sales assistant to travel to and from the stockroom. To learn more, view the video hosted by Burberry chief creative officer Christopher Bailey at http://www.youtube.com/watch?v=CokbQWl_15U

The Future

Digital signage is a relatively new medium, but it is unquestionably here to stay—in part, the technology itself will see to that:

• Displays will continue to evolve. Each year sees new options that are thinner, lighter, more flexible and more energy-efficient. All of this will make it easier than ever to put a screen anywhere.

• Processors will continue to evolve: Enhancing the ability to combine HD video, graphics, interactivity and real-time viewer analytics.

• Networking will continue to evolve: Faster and more cost-effective wired and wireless networking options will create new options for deploying digital signage.

But the biggest factor driving the growth of digital signage will be the value it provides.

Digital signage works. That’s why organizations in a wide range of industries—including retail, hospitality, quick service restaurants, financial services, higher education and more—are increasingly giving digital signage solutions a critical role in marketing and customer service.

If you are ready to get started, this guide is here to show you the way.

To go to online and learn more, visit http://www.intel.com/p/en_US/embedded/applications/digital-signage?iid=4656#solutions
Adidas: Virtual Merchandising

What happens when your retail outlets lack the resources to fully and effectively display your products? For adidas, the global sporting goods company, the solution was the Virtual Footwear Wall that gives in-store shoppers access to expanded online inventory via a digital display. Using state-of-the-art touchscreens and precision real-time 3D rendered products, shoppers can select products on a virtual shelf, view the product from any angle and get further product and technology information. Built-in anonymous video analytics provide metrics on shopper trends, demographics, and shopping patterns, enabling adidas to provide personalized experiences and relevant value-add services to shoppers. Finally, shoppers can also buy products via tablet-based checkout. See the adidas Virtual Footwear Wall in action at http://www.youtube.com/watch?v=UZohuBqoM4c

Rite Aid: Matching Customers and Product

The marriage of vending machines and digital signage is well underway at Rite Aid. The third largest drugstore chain in the U.S. was looking for more effective ways of matching products with customers when it developed the idea of the 3D Rewards Center with its technology partner, Provision Interactive Technologies: a 3D holographic digital signage display/kiosk that can dispense coupons, promotions and sweepstakes, serve as an Internet portal, administer customer loyalty programs, and support cross-selling opportunities. The 3D Rewards Center also performs anonymous video analytics to determine the age and gender of customers standing in front of it. As a result, the system can play content and advertising suitable for the audience (there's no point in telling a teenager about a promotion for reading glasses.)
Costa Coffee: Personalizing the Engagement
Using a vending machine is a fairly impersonal experience. The machine is unattended, operates under very strict rules (e.g. coins only) and doesn’t really care who you are, if you are satisfied and/or if you ever come back.

Costa Coffee, a purveyor of premium coffees (it’s the market leader in the United Kingdom and the world’s second largest coffee chain) decided to change all of that by rolling out the Costa Express CEM-200 concession, a vending machine that integrates touchscreens, cashless payment, telemetry, near-field communications and digital signage.

Because consumers vary in their coffee tastes based on age and gender, the machines use Anonymous Viewer Analytics to capture demographics and offer a specific selection of coffees at each location. Touchscreens and cashless payment options enable customers to buy more items, e.g., ordering coffee for a group with a single transaction. Learn more about the Costa Coffee solution at http://www.intel.com/content/www/us/en/retail/intelligent-coffee-station-solution-blueprint.html

McCormick: Interactive & Sensory
McCormick, the global spice and seasonings company has an iconic brand with a 100+ year history. But McCormick found that widespread awareness of its brand didn’t necessarily mean people fully understood how much McCormick has to offer every aspect of cooking, grilling, baking and meal planning. The brand has taken to enhanced consumer engagement in a big way: rolling out a 3,800 sq. ft. retail store in Baltimore where the main attractions, in addition to McCormick spices and seasonings, are a series of digital enticements that include “Guess That Spice” (a scent-emitting kiosk that tastes your sense of smell), “FlavorPrint” (a taste bud personality digital game), “FlavorExplorer” (a digital exploration of the history of spices), “Flavors in the Making” (a series of farm to table digital videos) and “Demo-Flavor” (a cooking demo area).

None of the interactions are specifically “selling” McCormick solutions. Instead, each interaction is designed as an opportunity to raise awareness of the wide range of flavor choices people have at their disposal—which is exactly the “brand story” McCormick wants to tell. What makes the McCormick example particularly interesting is that the company continually gathers statistics to see what’s working.

All of the engagements are fun, easy to use, visually appealing and integrated into the overall store design. It also helps that sales associates are actively trained on how to use them as part of their sales process.

The underlying technology for the store includes touch-enabled HP* digital signage displays running on HP TouchSmart* All-in-One PCs with Intel® Multi-Core processors. Though the technology is not exotic—the concept of embedding a scent cylinder in a kiosk certainly is. In addition, all of the hardware is remotely monitored and managed using Intel® Active Management technology (Intel® AMT) to promote uninterrupted service.
2. Getting Started: The Basics

Digital signage is a long-term investment. Before you get focused on the hardware and software, take a step back and look carefully at these basic concerns. Also, take advantage of the Getting Started Checklist to help organize your thoughts.

1. Objectives

Give plenty of thought to what you want your digital signage solution to accomplish. Getting clear on your objectives will play a major role in determining the design of your digital signage solution. You can have multiple objectives and they can change over time. Some typical objectives include:

- **Lowering costs:** If you rely heavily on slower, costly and less efficient methods to distribute information in your organization, digital signage can save you money.

- **Information or way finding:** Providing information for specific locations, events, arrivals/departures etc. is a classic use of digital signage particularly in transit centers, hospitality, schools, large retail complexes and many other locations.

- **Increasing sales:** Using digital signage to make people more aware of your products and services is a proven way to increase sales. New offerings and promotions are obvious ways to use signs. Linking your digital signage with inventory enables you to automatically update pricing for products that are reaching their expiration date.

- **Merchandising:** Interactive digital signs make it possible to make a virtual product presentation—the consumer can view the product from all angles, see videos, get information, place an order, etc. This can reduce stocking and inventory requirements making it possible to market a wide range of products more cost-effectively.

- **Enhancing the customer experience:** "How to" videos that give people new ideas about using your products. Multitouch-screen signs/kiosks that enable people to get quick access to information they need. These are just two examples of how digital signage can enhance the customer experience.

- **Enhance/extend your brand:** With HD video, animated and/or glassless 3D graphics and new levels of interactivity, digital signage is a great way to create high-impact brand messaging.

Focusing on objectives first will make it much easier when you make other key decisions regarding hardware and software.

2. Content

There is no question that choosing the right hardware and software is critically important, but a content strategy is even more important. What do you plan to show on your screens Day one? Month one? Year one? Who will create and maintain this content? How will you determine that it’s the right content? Your content strategy will be the single biggest contributor to the success of your digital signage solution.

3. Scalability

When specifying requirements, it’s essential to think about where you might be in the future. Keep in mind:

- Consumer expectations are evolving as rapidly as the devices they use (think of the rapid spread of tablets), which will directly impact your use of content. Interactivity and the various levels/types of analytics are also changing rapidly.

- Trying to keep software and imagery common for two-three years may require that you keep all devices anchored to a minimum specification, forcing you to underutilize newer systems.

- Your objectives may change. While your content today may be focused on driving sales, after deployment you may find that you want to vary your objectives (e.g., to ambience or education) based on traffic patterns.

It will be much more cost effective to change software than to swap out an entire hardware platform.
Dell Digital Signage Solutions

Dell simplifies digital signage by providing complete solutions from one trusted, open-standard provider. Dell specializes in developing digital signage solutions that let businesses manage their communications at any level and change content at a moment’s notice.

Displays

Dell is the world’s leading provider of flat panel displays—partnering with best in class display manufacturers Samsung and NEC to provide a choice of display features and capabilities:

- Commercial and consumer displays that offer a selection of built-in features such as button lockout, ability to run 24/7, automated turn-on and off, enhanced video color, and ability to network, locally store, and stream content including HDTV.
- Large-format display sizes from 32” to 108” or video walls made up of hundreds of TVs.
- Touch screens and interactive displays to drive user immersion, brand recognition, upselling opportunities, and analytic based metrics.

Hardware to Deliver Content

Dell PCs and Servers

- For managing content and digital signage applications rely on any Dell PC.
- Create a network infrastructure for digital signage taking advantage of any of the range of Dell PowerEdge server configurations—from one central server managing content on a network across multiple remote locations, to one server for each location for non-networked, locally managed content.

Dell Media Players

The Dell OptiPlex makes an ideal media player, providing flexibility, scalability, and power for a rich image experience in a compact chassis that fits anywhere:

- OptiPlex 9020 Micro: Performance that drives productivity with a range of processors including 4th Generation Intel® Core™ i7 processors with Intel® Integrated Graphics. Supports three monitors with DisplayPort and VGA connectivity. Up to 16GB of memory.
- OptiPlex 3020 Micro PC Desktop: Essential performance in micro design. Rely on a range of processors that include 4th Generation Intel® Core™ i5 processors with Intel® Integrated Graphics. Serviceability is simple with tool-less entry. Supports two displays with DisplayPort and VGA connectivity. Up to 8GB of memory.

PC Board: Used with select displays’ expansion slots, a PC board eliminates the need for an external PC, cabling, mounting and power supply. It provides for clean, hidden integration, while reducing the bill of materials needed for installation and eliminating the need to hide hardware equipment.
Getting Started in Digital Signage: A Step-by-Step Guide

Getting Started Checklist

Here are some of the key questions you need to start asking as you begin planning your digital signage solution. It’s important to take a “big picture” look at your plans. There will be plenty of time later to get further into the details of hardware and software selection.

1. Basic size and scope of the digital signage solution you have in mind?
   Number of locations: ________________________________
   Number of screens/displays per location: ________________________________
   Other factors that will dictate the size and scope of your solution: ________________________________

2. Timeline for implementing your solution?
   □ 3 months
   □ 6 months
   □ One year
   Other activities that this is contingent upon (e.g., completing construction/renovation on other locations): ________________________________

3. Who are the major decision makers who will impact this project?
   □ CEO
   □ CFO
   □ IT
   □ CMO
   □ Customer Service
   Other decision makers (e.g., line of business owners): ________________________________

4. What is your intended audience?
   □ Customers
   □ Visitors
   □ Employees
   Other audiences: ________________________________

5. What are your objectives?
   □ Drive sales
   □ Enhance brand awareness
   □ Educate and inform
   □ Enhance customer experience
   □ Internal communications
   □ Monetize your displays

6. Content you intend to show?
   □ Slides with text and pictures
   □ HD video
   □ Animated graphics (e.g., Flash graphics)
   □ Advertisements
   □ 3D content (glassless)
   □ Live feeds, i.e., network TV or the Web
   □ Information drawn from internal databases (such as a calendar of events, menu items, etc.)
   □ Information from external data sources (such as weather, traffic, local news, etc.)
   Other: ________________________________

7. How do you plan to create content?
   □ Use in-house resources
   □ Hire an agency
   □ Acquire ready-made content
   □ Rely on the product manufacturer
   Other content resources: ________________________________

8. How will you manage your content?
   □ Locally
   □ Centrally
   □ Centrally with limited localization

9. What screens are right for you?
   □ Floor-standing, poster-like stands
   □ Monitors hanging from the ceiling
   □ A video wall
   □ Interactive kiosks
   □ Screens embedded in other devices, such as gas pumps or vending machines
   Other options: ________________________________

10. Where do you intend to place display devices/screens?
    □ Near entrances/exits
    □ Check-out/point of sale areas
    □ Waiting areas
    □ Aisle end caps
    □ Out of doors
    Other locations: ________________________________

11. What level of interactivity are you looking for?
    □ No interactivity
    □ Touch-screen interactivity
    □ Touchless (e.g., gesture-based) screens
    □ Interactivity via mobile devices
    □ Content triggered by a scheduled event
    □ Content triggered by the age/gender of the viewer
    Other forms of interactivity: ________________________________

12. How do you plan to measure the performance and ROI of your digital signage solution?
    □ Audience demographics gathered in real time
    □ Awareness and recall surveys conducted after the fact
    □ Sales performance (e.g., sales data linked to the time when specific content is showing)
    □ Social media analytics
    □ Usage analytics
    Other ways of measuring performance: ________________________________

13. How do you plan to manage your digital signage network?
    □ Asset management
    □ Software updates
    □ Security
    □ Remote repair and diagnostics
    Other ways of managing your solution: ________________________________

14. How many nodes will exist in a full digital signage network deployment?
    □ <100
    □ <500
    □ <1000
    □ >1000

Digital Signage Getting Started Checklist

Other content resources: ________________________________
Other decision makers (e.g., line of business owners): ________________________________
Other activities that this is contingent upon (e.g., completing construction/renovation on other locations): ________________________________
3. Creating Content for Your Digital Signage Network

Operating a digital signage network—whether it is one screen or thousands—is like operating a movie theatre or a TV station or creating Web content that will appear on computers and mobile devices.

In essence, digital signage is a way to deliver creative content—what people see when they look at your screens.

In fact, because digital signage is like all of these things (film, TV, PC/Web, mobile), it is sometimes referred to as the “fifth screen.”

That’s why a well thought out, long-term content strategy is absolutely critical to getting value from your digital signage investment.

What Is Content?

Content can take the form of:

- **Slides:** It’s easy to create these using a basic (but powerful) program such as Microsoft® PowerPoint.
- **Pictures:** In most cases, any picture in digital format.
- **Graphics:** Logos, icons, illustrations, etc.
- **Animated graphics:** Treatments of your logo or other graphics that have movement, zooms, fade ins/outs, etc.
- **3D graphics:** There are now 3D graphics that do not require special glasses.
- **Video:** Because digital signage is so close to traditional television; video is probably the content people expect most.
- **Live feeds:** You can stream live information from broadcast networks, websites, RSS feeds, blogs, twitter, etc.
- **Database content:** Information stored in databases (such as event schedules, menu items, prices, promotions, other listings) can be programmed to appear on your digital signs.

How Much Content Do I Need?

The amount of content you need is a function of your operating environment, the objectives you want to accomplish and (of course) your budget.

To really establish a content strategy, it’s helpful to think in terms of the “dwell time”—how long will the typical viewer spend with any content you create. Dwell time differs based on the environment:

- For example, if you are creating content for signs that will be placed in the waiting area of a medical center—where the average person spends 15 minutes—you could create a loop of material that lasts 10 minutes. The loop can consist of dozens of smaller segments—short advertisements, interviews, etc.
- If you are creating content for a sign that is located in the corridor of a busy mall—where the average person is within eyesight of the sign for 15 seconds as they move down the corridor—you might decide to have a series of still images with each one displaying for 7.5 seconds. In this way, the average person sees at least two.

Frequency of Visits

Another factor to consider is the frequency of customer visits. A gas/petrol station might determine that the average dwell time for a customer is three minutes to fill a tank of gas, and that the typical customer visits once per week. For this situation, it might be appropriate to have a three-minute loop and to change the entire loop every five days.

These examples of dwell time and frequency are for illustrative purposes only. They are not intended to provide guidelines. Hopefully, you get the idea that when creating and scheduling content you want to make some practical determinations about the viewing time. There is no value in producing a 30-minute program if your typical viewer only has five minutes of viewing time.

Some other key points to keep in mind:

- Less is more. People expect to get your message quickly. If it takes too long to get to the point, you risk losing your audience.
- Look for ways to ensure that the viewers have a chance to see/hear your primary message at least two or three times.
- If you are creating an extended loop of material, try to vary the length of different segments and mix them together—a 30-second message followed by one that is two minutes, another that is one minute, etc.

What Content Should I Develop?

Your content should help support your business objectives. Here are some examples of how to link content to objective:

- **Drive sales:** Consider highly focused product pitches (under one minute in length) that will quickly grab the attention of a potential buyer.
- **Inform/educate:** Take the opportunity to create some longer-form (two-minute plus) presentations that provide useful, relevant information.
- **Entertain:** Create eye-catching, fast-moving, humorous and engaging content—ranging from a few seconds to a few minutes.
- **Ambience:** Look for unobtrusive content that viewers can appreciate or engage with.

One key rule of thumb is to have a mix of content. If you are constantly bombarding consumers with advertisements, they may begin to tune you out.
 Audience
To develop the right content, think about your audience in terms of:

• **Age:** The pacing and style of any content may be different for a senior audience than for one younger.

• **Gender:** Is your content suited for both men and women? Or are you targeting one or the other?

• **State of mind:** Is your audience focused on achieving a goal (e.g., a commuter racing for a train) or relaxed (e.g., standing in line for popcorn at a movie theater)?

 Scheduling
It’s likely your audience is different based on the location, time of day, day of week or even season of year.

• For example, a restaurant might discover that diners during the day tend to be older than in the evening.

• A bank might find that its audience is much different on Fridays, when many people are there to cash paychecks, than on other days.

• A retailer might have different stores appealing to different demographics (youths, seniors, men, women) and want to vary the signage content in each one.

Many content management systems available today allow you to target your audience and deliver content tailored to a specific demographic. This guide will address this further in the section on content management systems.

 Video and Graphics
Video and highly animated graphics are becoming much more common on digital signage networks. Many of the latest media players offer stronger, built-in video processing capabilities than previously, making it possible to render fast-moving, HD video content in conjunction with other processes smoothly and without interruption. All of this is raising the stakes for what appears on digital signage networks.

Also, in recent years, the 3D-graphics-rendering capabilities of processors has been significantly enhanced and displays that show 3D without requiring special glasses are becoming more common. As a result, you are going to see more and more 3D on digital signage.

 Developing Content
There are many ways to get the content you need:

• **In-house:** Depending on what kind of content you have in mind, you may be able to create it using in-house resources: taking photos with digital cameras, adapting them with Adobe® Photoshop, creating advertisements with tools like Adobe® Illustrator or Microsoft® PowerPoint, shooting video with a digital video camera and editing it on a computer—it’s all possible today. Also, many of the content management systems for digital signage provide built-in templates and other content creation tools. But keep in mind, all of this takes certain skill levels and time.

• **Outside support:** If you already rely on the services of an advertising agency, a marketing communications company, a public relations firm or similar provider, turn to them for help (once you have given thought to your key objectives).

Remember, from their experience watching TV, going to movies and on the Web—people are accustomed to seeing well-produced, highly polished content. You don’t want to send the wrong message by presenting content that is amateurish.
Content Development Checklist

1. What content do you anticipate using?
   - Slides
   - Pictures
   - Graphics
   - Animated graphics
   - 3D graphics
   - Video
   - Live feeds
   - Database content

2. What will be the dwell time of the typical viewer?
   - 15 seconds
   - 30 seconds
   - 60 seconds
   - 1-5 minutes
   - 5-15 minutes
   - 15 minutes+

3. What is the objective of the content you will be using?
   - Drive sales
   - Inform/educate
   - Entertain
   - Ambience/atmosphere

4. What is the makeup of your primary audience?
   - Gender: _______________________
   - Age: _______________________

5. Who will be responsible for developing content?
   - In-house resources:
   - External resources:

6. Who will be responsible for approving content?

7. What content do you have available now? (List all that’s currently available and the format that it is in.)
   - __________________________________________
   - __________________________________________
   - __________________________________________
   - __________________________________________
   - __________________________________________
   - __________________________________________
Choosing a Content Management System

Once you come up with a basic content strategy for what will appear on your digital signage screens, you also need to decide when and where this content will appear.

- Will the same content appear on all screens at all times?
- Will you keep repeating the same content over and over all day?
- How do you manage content if your digital signage is interactive?
- How can you prove to an advertiser that a particular piece of content appeared at a specific time and place?

Managing and scheduling content is a major challenge in a digital signage network. But don’t worry; there is software that will handle many if not all of these tasks for you. It is referred to generally as a Content Management System (CMS) such as Intel® Retail Client Manager, (Intel® RCM).

Basic Functions

While every CMS is different, the basic functions will almost always include:

- Adding content for playback
- Organizing content into libraries
- Sending the content to the displays

Content Development

A CMS solution will help support the development of content. It typically comes with a library of page templates that users can use to adapt and update content. You can also use your own content development tools, such as Adobe® PhotoShop, upload the content and then use the tools in the CMS to manipulate it to make it more dynamic.

Scheduling Content

One of the primary capabilities of any CMS is content scheduling: determining what content to play, where, at what time and on what date. Often, this is referred to as a playlist.

It is likely that this is where you will see a great deal of variation in capability from one CMS to another. This is to be expected. A CMS designed to schedule content for an organization with a global network of thousands of screens is going to be very different from a CMS designed for a company with a much smaller digital signage network.

Some of the content scheduling capabilities to look for include:

- Use of content tagging to match locations and content based on specific attributes and demographics
- Targeting content to specific zones on specific screens (i.e., zones for video, images, TV feeds, ticker feeds, etc.)
- Offline playing in the event that the connection fails
- Automatic content download recovery

Interactivity

If your digital signage solution supports interactivity—users selecting options to create some kind of self-directed experience—you will want to look carefully at the options available in the CMS for varying content based on user input. For example, is the CMS designed to handle touch input or data from sensors/cameras that can detect the gender/age of a viewer and adapt the content accordingly?
Real-Time Integration with Data Feeds

Constantly creating original, up-to-date content can be time-consuming. A CMS can help by integrating with databases, pulling content from internal sources or public databases. Some CMS suppliers have agreements with content providers that allow you to incorporate free content (e.g., news, weather feeds) at no additional cost. You also will want to take a careful look at the ability to integrate with your own internal databases. For example, does the CMS make it possible for content to be driven by inventory and/or sales-out data?

- As products near their use by date, the sign offers discounts to drive sales before they expire, continuously adjusting the discount needed to achieve complete sellout.
- Once a promotion sells out, the content switches to a backup promotion.

Other Key Criteria for Choosing a CMS

Here are other key factors to look at when evaluating a CMS:

Administrative/user permissions: How much control do you have over who is allowed to post content to your system and make decisions about when and where it will appear? (Important: you don’t want inappropriate material broadcast on your network. It has happened in several widely publicized cases.)

Advertising: If you are interested in running third-party ads on your network (and collecting the revenues for it), you may want to consider a CMS supplier that can link you into a larger network of advertisers. Rather than you having to go out and find the ads, you’ll simply list the inventory (when and where you are willing to run the ads), and the CMS supplier will make the connections to help you sell that inventory.

Audience measurement: What capabilities are provided gathering anonymous analytics about who is viewing content? What options are there for integration with other audience measurement solutions such as the Intel® AIM Suite? Intel® AIM Suite is integrated into Intel® RCM to create a seamless content management and analytics solution.

Ease of use: How simple is it to make regular updates to content? Will this be something you can easily manage with internal personnel?

Network utilization/management controls: How robust are the tools for monitoring the network and maintaining control over the players and screens, including powering players and screens on and off to match opening/closing hours?

Proof-of-play reporting: This is important if you are running third-party advertising and need to be able to verify that the material appeared as promised.

Remote access: Are you able to make updates, layout changes or remove expired content via the Web from any location?

Hosted or Cloud?

Should you host your own CMS system or go to the cloud? Hosting your own CMS obviously gives you more control. The challenge is that unless digital signage is a core business competency in your organization, you may not be in a position to allocate resources to it.

A hosted CMS using Software as a Service (SaaS) eliminates the need for IT departments to learn and maintain yet another individual system. The SaaS company has specialists who focus on CMS 24/7 rather than as a small part of their total workloads, which means they have the knowledge and incentive to keep your system up to date and operating smoothly.
**Why Intel® Retail Client Manager (RCM) CMS?**

For these and other applications to be successful, the right information must appear in the right place at the right time. In a nutshell, that’s the purpose of the Intel® Retail Client Manager—it’s software designed for managing content across consumer touchpoints.

Intel® RCM can handle many types of content formats, inclusive of: video, photos, slides, text, animated graphics and much more. It relies on a familiar interface (designed for the non-technical user), providing a whole range of features for choosing content and scheduling when and where it will appear. And it integrates seamlessly with other Intel based solutions such as Intel® AMT (for remote management and maintenance) and Intel® AIM Suite (for gathering audience metrics).

For today’s reseller, Intel® RCM offers significant opportunities to enhance the performance of digital touchpoints—helping you maximize the value you provide to your customers and also build long term relationships that can include providing ongoing content creation and management services.

Intel® RCM is a platform designed to evolve as the world of intelligent touchpoints grows and evolves. As they become more pervasive, the requirements for managing, securing and delivering content to them will increase. By providing robust content management capabilities and integrating with solutions for remote management, security and analytics, Intel® RCM is an ongoing solution you can rely on to build solutions for the changing world of marketing and customer experience.

Intel® Retail Client Manager enables businesses to:

- Compose campaigns and deliver customized content in minutes
- Deliver captivating customer experiences across any kind of display-based touchpoints (digital signs, kiosks, POS system)
- Increase uptime and lower costs with an integration with Intel® Active Management Technology (Intel® AMT)
- Improve advertising effectiveness with Intel® Audience Impression Metrics Suite (Intel® AIM Suite)
- Manage video, photos, animated graphics and much more to create eye-catching displays
- Schedule when this content will appear, in what order, on what screen and for what audience
- Publish a message at hundreds of locations, at a handful of locations (in a specific department, aisle or screen—or even a part of a screen)
- Enable touchpoints to adapt in real time to changing circumstances, such as user input, variations in foot traffic, demographic patterns (for example, women shoppers in the morning, male shoppers in the evening) or the weather
- Manage security and permissions to ensure that only authorized content is shown
- Make it possible for all of this to be done by non-technical, non-IT personnel.
Here is a checklist of capabilities for selecting a CMS:

1. General
   - Operating system: Windows, Windows and/or Linux, Apple
   - Support for wired, wireless and 3G/4G mobile networks
   - Touch-screen support and other interactive options
   - Multiplayer video and audio synchronization
   - Supports standard media formats—JPG, Flash, Flash Video, WMV, MPEG, MOV, URL, RSS, Microsoft® PowerPoint, TV, Channel, video streaming, mobile messages and more
   - Integration with anonymous viewer analytics software

2. Content Development
   - Reusable presentation content templates for easy content publishing
   - Centralized content management and distribution
   - Web-based UI for content publishing, remote display management, player monitoring, control and upgrade
   - Content performance tracking and reporting
   - Content programming access control down to individual channel and screen zone level
   - Content publishing workflow (preview, draft, pending, approved, live, expired)

3. Scheduling/Targeting
   - Targeting locations through the network hierarchy
   - Content tagging for targeting locations with specific attributes and demographics
   - Exclusion or inclusion used to handle exception in content publishing
   - Flexible screen layout with multiple zones for video, image, TV, tickers, etc.

4. Real-Time Data Integration
   - Real-time or scheduled content playback
   - On-demand interactive layer seamlessly integrated with digital signage content
   - Integration with Web 2.0 applications including Google Calendar, Flickr, Twitter, and more
   - RSS or XML feeds with local player cache
   - Emergency alert screen override layer with instant emergency message delivery
   - Seamless content updating while playing
   - Continuous offline playing when Internet connection is down and automatic content download recovery

5. Management
   - Dedicated hardware/software
   - Web-based management

6. Notes on Content Management Systems Under Consideration:
   ____________________________________________________________
   ____________________________________________________________
   ____________________________________________________________
   ____________________________________________________________
   ____________________________________________________________
5. Selecting a Media Player

The media player is the workhorse in any digital signage solution. It provides the processing power that gets content to your screens and keeps it playing.

There are a wide range of media players on the market. But don’t even bother starting to make this selection until after you have analyzed your objectives and your content strategy. Then you are in a position to determine the media player that best meets your needs.

Some of the key differences between the various media players include:

**Processing power**: The flawless presentation of HD video and animated graphics depend on the compute and graphics capabilities in your media player.

**Operating system**: Windows, Linux or Apple—there are options for everyone.

**Storage**: Media players come with both Hard Drives (HDs) and Solid State Drives (SSD). HDs are the most competitively priced, but SSDs have become more affordable, use less power, can deliver higher performance and (with no moving parts) have higher reliability.

**Network connections**: The ability to connect effortlessly to a wide range of networks, screens and other devices depends on how well a media player supports the growing range of interfaces available today.

**Form factor**: Media players can range from traditional PC-like boxes to small, fanless, embedded devices.

**Commercial or consumer grade**: What may come as a surprise is that you can’t really choose any of the hardware offered at the typical consumer electronics store. You need a “commercial grade” device, one that’s designed for long operating hours (nights and weekends included) and demanding operating conditions, such as the greasy, smoky environment of a fast-food restaurant.

**Embedded PCs**

In the early days of digital signage, it was typical for the media player to be based on general purpose PC platforms. Now, increasingly, you are seeing “embedded” platforms. These are special purpose PCs designed for digital signage applications and typically feature a small form factor, low power consumption and a fanless design. These can be fully enclosed in a chassis/case or mounted directly on the back of a screen. They are ideal for environments where dust or pollution may be a problem. Increasingly, these embedded solutions rival the power of high-end PCs, featuring multiple cores, dedicated graphics processors and support for multiple streams of HD video. Also, unlike traditional PCs (which may have a product lifespan of 9-12 months), embedded solutions typically have lifespans measured in years, which simplifies ongoing support.

**Processor Performance**

As digital signage applications become more interactive, connected and multimedia-rich, they require more processing power. You need a media player that can easily handle HD and even 3D video, touch-screen interaction and real-time audience analytics without skipping a beat.

When Intel is advising clients on digital signage implementations, it breaks down processor requirements as follows:

- **Basic implementation**: A basic implementation might involve a single player and a single screen. Content consists of a loop of still images and video played in sequence. There is no blending with real-time video and Web feeds, and there is no gathering of audience analytics. For this kind of implementation, Intel recommends a solution based on an Intel® Core i3 or entry-level Intel® Atom Processor.

- **Mainstream implementation**: A mainstream implementation might involve a single player and multiple screens. Content consists largely of HD video blended with real-time video and Web feeds. Viewers can interact with the signage via touchscreen input and mobile devices. Sensors attached to the screen gather anonymous analytics for audience measurement. For this kind of implementation, Intel recommends a solution based on an Intel® Core i5 processor.

**High-demand implementation**: A high-demand implementation might involve a video wall with extensive HD video and real-time video and Web feeds along with numerous opportunities for audience interaction and real-time gathering of audience analytics. For this kind of implementation, Intel recommends a solution based on an Intel® Core i7 processor.

**Optimized Software**

As digital signage becomes more pervasive, you are seeing more operating software specifically designed for signage applications. For example, Intel and Microsoft have worked together to optimize Windows® Embedded Standard 7 operating system on the Intel® Core microarchitecture, making it easier and more cost-effective for digital signage device-makers to create new, interactive capabilities. For example, developers can take advantage of image configuration that is optimized for signage applications, supporting the kinds of immersive, interactive experiences that are very appealing to retailers.

**Standardization**

A major goal of the digital signage industry is to develop standard hardware formats that make it easy to connect components—similar to the standards that are common in audio and video. For example, Intel has introduced an open pluggable specification (OPS) to define the size of the connector and electrical interfaces for the connector in DS components. Many manufacturers have already adopted this standard, making it possible (for example) to create media players that plug into the back of display monitors. This lowers costs for both developers and users. It makes it...
easier for operators of digital signage networks to swap media players if a failure occurs in the field, and also allows easier upgrades, future-proofing investments. To learn, see the video at http://www.youtube.com/watch?v=d-wzvMISp2U

Remote Management
Because digital signage networks can involve having hardware in a wide range of locations, being able to ensure that the screens can be turned on and off (for energy efficiency), remotely repaired and checked for proof-of-play (important when they are carrying ads) are all critical requirements.

Remote management with out-of-band capability makes it possible to remotely discover and repair many network problems without costly on-site service visits.

A system designed with this capability can be remotely managed as long as it is connected to a network and has power. Even if the operating system is nonresponsive, the out-of-band capability will allow the network operator to restart the system. Operators of digital signage networks can set up new installations, download software updates, perform asset inventories, and turn the signs on and off—all remotely. Remote management lowers the total cost of ownership by eliminating many types of expensive on-site service calls. Learn more about the Intel remote management solution at http://www.intel.com/content/www/us/en/architecture-and-technology/intel-active-management-technology.html
# Media Player Checklist

1. Processor: ___________________________

2. Memory: ___________________________

3. Dimensions: ___________________________

4. Power: ___________________________

5. Storage:
   - Hard drive
   - Solid state drive

6. Operating System:
   - Windows
   - Linux
   - Apple

7. Ports:
   - HDMI
   - USB
   - LAN/Ethernet

8. Network Connectivity:
   - Wired Ethernet
   - Wi-Fi 802.11a/b/g/n (note for Wi-Fi .11n and 5Ghz are preferred)
   - Wi-Fi 5Ghz support
   - 3G/HSPDA
   - 4G/LTE

9. Security:
   - WPA2 (min)
   - WPA2 Enterprise

10. Content Management Server to Player Security:
    - SSL (min)
    - VPN

11. Screen Connectivity:
    - HDMI
    - Display Port

12. Number of screens to be driven by the player: ___________________________

13. Screen Control (preferred): ___________________________

14. Screen resolution:
    - 1080
    - 4K
    - Other, please specify: ___________________________

15. Ambient Operating Temperature Range:
    - 5°C to +35°C
    - 0°C to +50°C
    - Other, please specify: ___________________________

16. Video Codec Support:
    - H264
    - VC1
    - MPEG
    - Other, please specify: ___________________________

17. Audio Support (outside of HDMI and or Display port):
    - Analog stereo L+R
    - Digital Audio
    - Coaxial
    - Optical

18. Media player operating noise level: ___________________________

19. If noise levels are important, please specify the maximum db level allowed: ___________________________

20. Notes on Media Players Under Consideration:
    - __________________________________________
    - __________________________________________
    - __________________________________________
    - __________________________________________
    - __________________________________________
    - __________________________________________
    - __________________________________________
    - __________________________________________


6. Choosing a Display Screen

Your display screens are the public face of your digital signage solution. To most viewers, your display screens “are” your digital signage network. While the hardware and software are hard at work in the background keeping track of different content, playlists and schedules, it all appears seamlessly on your display screens. There are literally hundreds of display screens available for digital signage. They vary in shape and size as well as the underlying technology. There are screens designed to be embedded in a gas pump, in a vending machine or free-standing poster-size displays for corridors and other public areas. There are screens designed to be part of entire video walls made up of dozens or even hundreds of monitors.

Commercial or Consumer Grade

Just as in the selection of other hardware (i.e., your media player) you want to stay away from screens designed for the consumer market. A screen designed for home or routine office use will quickly burn out if it is operating for 18+ hours per day and/or in conditions that are not optimal (i.e., poor air quality, outdoors, grease, etc.)

Ultimately, your choice should be dictated by how the screens are going to be used:

▪ **Content:** Will you be running still images, HD video, lots of text or 3D graphics? Having some sense of this in advance will help determine issues such as screen size, resolution, sound and connectivity requirements.

▪ **Interactivity** (i.e., single touch, multi-touch): Touch screens are becoming more and more common. Do you anticipate needing basic touch-screen functionality or multitouch: the ability to use more than one finger to “pinch” and “stretch” as on a tablet?

▪ **Placement:** Will the screens be free-standing on the floor, mounted on a ceiling or wall, or embedded in another device (i.e., a kiosk)?

▪ **Environment:** Are there issues with temperature, air quality, vibration (i.e., in a vehicle), lighting, daylight viewing out of doors, or proximity to the public?

Size

As noted earlier, display screens come in a wide range of sizes. The overall design of your environment will play a big role in determining screen size. Another key consideration is the proximity of the viewer to the screen, particularly if you expect the viewer to be reading text. If the typical distance is less than 25 feet, a 32-inch screen is typically adequate. For distances over that, consider a 60-inch screen or larger.

LCD or Plasma

Another decision point is display technology. Right now you have essentially two options:

▪ **Liquid crystal displays (LCD):** In LCD technology, the screens use liquid crystals encased in glass and are backlit by fluorescent lights or LEDs (light emitting diodes). LED backlighting has become much more common in the last few years. LCDs come in a wide range of sizes and are by far the most popular choice for digital signage solutions.

▪ **Plasma:** In plasma screens, the phosphors that create the image light up themselves and don’t require any backlighting. Plasma screens typically require more power than LCDs and are often heavier. However, many people prefer the image quality. Plasmas can be built larger than LCDs, but the size gap is narrowing.

Other Display Screen Considerations

Other considerations to keep in mind when selecting a display screen include:

▪ **Audio:** Will your installation require audio or will it run silently in the background? Many (if not most) digital signage solutions have no audio.

▪ **Brightness:** How much light is there in the area where the screen is located. The more light there is (i.e., outdoors, in direct sunshine), the brighter the display needs to be.

▪ **Bezels:** The enclosure that surrounds a screen is known as a bezel and may be an inch wide or more. But screens can also be built with very narrow bezels, which makes them better suited when a group of screens are put together to create a video wall.

▪ **Connections:** Display screens came out of the A/V world and have always supported A/V connections, such as VGA and RCA. In digital signage applications, they also need data network connections, including USB and RS232 inputs.

▪ **Landscape or portrait:** Display screens for digital signage typically have the versatility to be used in either portrait or landscape mode.

▪ **Heat dissipation:** Overheating is the major cause of screen failure in digital signage applications. Screens need to be designed with ventilation/fans to maintain the consistent temperatures that reduce the likelihood of burnout.

▪ **3D (glassless):** Processors and software capable of glassless 3D are coming onto the market.

▪ **Transparency:** An enclosed showcase fronted by a clear glass surface can display multimedia content in front of products placed inside the unit.
Display Screen Checklist

1. Number of locations where screens are needed: _______
2. Number of screens per location: ______
3. Total number of screens: ______
4. Size of screens: ______
5. Interactivity:
   - Single touch
   - Multitouch
6. Placement:
   - Free-standing
   - Ceiling mount
   - Wall mount
   - Embedded
   - Video wall
7. Operating Environment:
   - Normal
   - Industrial
   - Outdoors
8. Audio:
   - Yes
   - No
9. Bezels:
   - Thin
   - Thick
10. Notes on Displays Under Consideration:

_____________________________________________________________________________
_____________________________________________________________________________
_____________________________________________________________________________
_____________________________________________________________________________
7. Measuring Value
The biggest factor driving the growth of digital signage is the value it provides. Digital signage works—helping increase sales, support brands, delivers needed information, etc. That’s why organizations in a wide range of industries—including retail, hospitality, quick service restaurants, financial services, higher education and more—are increasingly giving digital signage a critical role in marketing and customer service.

Four Areas of Value
While the value that digital signage delivers will differ from organization to organization, it typically can be broken down into these four areas:

1. Higher revenues
   • More sales overall
   • More sales of higher margin products
   • More sales per customer visit
   • Ability to run more promotions than previously
   • More effective inventory management via dynamic promotions/price flexibility

2. Lower costs
   • Reduced costs of printing, distribution, installation, removal, etc., of printed materials
   • Increased speed of messaging and compliance or real-time campaign management
   • Improved customer service delivered more cost-effectively
   • Reduced shoplifting and stock shrinkage through deterrent messages
   • Increased virtual display of products when there is not enough room or budget to have them physically in the store

3. Enhanced customer experience
   • Increasing the opportunities for intelligent digital engagement and interaction
   • Reducing the perceived waiting time at check out and in waiting areas
   • Aligning with community and demographic interests with relevant information
   • Inexpensively refreshing the environment—particularly for frequent visitors

4. Increased customer engagement
   • Learn more about customer interactions via audience measurement
   • Promote online and mobile programs
   • Promote loyalty programs, gift cards, gift registry and website
   • Promote special events
   • Provide reasons for a future visit

Measuring Value
There are many ways to measure exactly how much value is being derived.
Companies can conduct before and after surveys of revenues and costs, track patterns in loyalty program sign-ups and registrations, and conduct surveys of customers to evaluate the impact on attitudes about customer service, brand recall, overall satisfaction, etc.

• A bank uses digital signage to deliver promotional spots for its mobile banking apps, college savings plans, home lending options and other services. After running loops with a playlist dedicated to a specific set of services, it switches to a new playlist. Daily trends are tracked to determine the effectiveness of the spots and the impact on the acquisition of these services.
• An appliance retailer uses digital signage to convey branding messages, emphasizing new products and features. In-store surveys of customers on brand recall are correlated with specific playlists, while sales figures show the impact on the bottom line.

The integration of smartphones and the social Web with digital signs offer another set of opportunities for measurement, including capturing the opt-in data from interested buyers that is the holy grail of all marketing efforts:

• A quick-service restaurant uses its digital signage to promote menu items, some with a promotional coupon (i.e., “Use discount code XYZ to get a dollar off this meal!”) that can be downloaded on a smartphone. The restaurant can then use point of sale (POS) data to evaluate the impact of promoting specific meals and also learn from the “coupon data” captured.

Anonymous Viewer Analytics: Measuring in Real Time

Measuring marketing ROI is nothing new. Smart marketers have always followed the mantra of “Test, Measure, Optimize”; experimenting with new creative, running A/B tests, etc.; measuring the results and then using that data to adjust both the content and the implementation. But this process used to take weeks, months, even years. The Internet changed that—online marketing efforts can be tested and adjusted in just days, even hours. Digital signage delivers that same flexibility through the use of Anonymous Viewer Analytics (AVA).

AVA makes it possible to provide actual audience measurement data: how many watched, for how long, gender, age, time of day, etc. The data is gathered via small optical devices connected to a digital sign. Software, such as Intel® Audience Impression Metric Suite (also known as Intel® AIM Suite), utilizes face-detection algorithms to aggregate the data, categorizing each capture and keeping score on how many people looked at the content, how long they watched, and their demographics (e.g., gender and age range). The data is completely anonymous. No image is captured and no identifying data on any individual is stored. Links with the Content Management Software allow for analytics on a specific content spot.

Directly relating this data to sales numbers can help companies refine and improve their content strategy as well as the setup of the digital signage itself. For example, the data can be visually mapped to show “hot spots,” giving instant visual confirmation of where people are most likely to linger within the store.

If the signs are being used to display third-party advertising, the data can help advertisers choose which networks will help them reach their demographic and also set advertising rates for specific time periods. This data creates the “common currency” that enables advertisers to evaluate their purchases in digital signage against other mediums. To learn more about Intel® AIM Suite go to http://www.intel.com/content/www/us/en/retail/retail-aim-suite.html?wapkw=intel+aim+suite
8. Managing Your Digital Signage Network

The fact that digital signage can be deployed anywhere is a tremendous benefit—but also a huge challenge. What do you do if a media player malfunctions? Or a screen goes blank? Sending someone to go on-site each and every time a problem arises is impractical and expensive.

This problem isn’t just a matter of geographic distance:

- A university campus, shopping mall or sports arena with hundreds of screens will want the ability to power monitors on and off to manage display life and minimize energy consumption. Doing this one by one is impractical.
- When an emergency arises—particularly during off-hours—having the ability to remotely activate displays to show warnings about emergency weather conditions or other contingencies can be a matter of life and death.
- Finally, you may need to verify that a specific piece of content actually played on a specific screen, at a specific place at a specific point in time.

The answer to all of these challenges is to manage the network remotely. Compared to sending someone on-site, remote management saves cost and time.

Evaluating Remote Management Options

Because remote management is so critical to digital signage, a wide array of options are available. Some key things to look for include:

Centralization: You need to be able to both monitor and control every device on your network, collecting and cross-checking the information that will deliver both an understanding of overall network performance and specific issues related to individual equipment failure.

Ease of use: Look for an interface that delivers full control without forcing the manager to manage screen after screen of technical data.

End-to-end: Failures can occur anywhere. The right management solution needs to deliver end-to-end performance monitoring, tracking media from its point of origination to its point of destination.

Proof of performance: Simply knowing that a screen or media player was operational doesn’t tell you if the scheduled content actually appeared. Your management system needs to be able to deliver proof of performance.

Flexibility: A major reason to have a digital signage solution is to keep adapting it to the specific needs of your business. Your management solution should be transparent to business processes and capable of adapting when new devices/services are added.

How Does Processor Choice Impact Network Management?

In addition to evaluating different software options, also consider the remote management capabilities within the processor of your media player.

Traditional remote management consoles communicate with devices using standard networking capability (an in-band link). When equipment fails, the in-band approach significantly limits the types of problems or failures that can be fixed remotely. By contrast, a solution that uses Intel® vPro™ Technology with Intel® Active Management Technology (Intel® AMT) enables management 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 signage system that won’t run or boot. The Intel technology uses an “out-of-band” link that operates independently of the “in-band” channel of the computing system and provides persistent connectivity.

Intel® AMT also includes a feature called KVM redirection over Internet Protocol (IP). This permits the keyboard-video-mouse (KVM) on an IT console to control and display the graphical user interface (GUI) of signage systems in the field. No additional hardware is required.

The Intel solution also enables proof-of-play by capturing screen shots and time stamps at regular intervals, thereby providing evidence of what the system played throughout the day.

Security

Because of its highly public-facing nature, security is a critical issue in any digital signage installation. Security breaches can occur as a result of physical access to a display or media player, or unauthorized access via network communication. The operator of a digital signage installation with inadequate security risks loss of reputation, lost revenue as well as potential for litigation.

Typical security issues include:

- Displaying inappropriate and/or unauthorized content
- Tampering with proof-of-play and proof-of-impression data (e.g., to collect revenue for advertisements that were paid for, but not shown)
- Displaying false alert messages in a public place, leading to a potential loss of life and property
- Inserting fraudulent software patches or URLs

Countermeasures

Typical security tactics include:

- Remote monitoring
- Use of secure communication protocols (SSL and or IPSec/VPM)
- White listing—only validated applications can run on the machine
- Policy-based, secured patching—to prevent fake updates to be applied by unauthorized persons
- Content protection—to prevent the placement of content that is not fully reviewed and approved in advance

A major reason why retailers have been leaders in adopting digital signage is because consumers want more of the "online experience" when they are shopping in a store. Having great products and beautiful merchandise displays is essential—but not enough. You need to give consumers information about what they are seeing and make it easy for them to share it. Leveraging information and making it relevant, personal and easy to use underlie the new shopping experience in the era of the connected consumer.

Digital signage plays an active role in meeting this challenge. Let’s take a look at what a typical day at the mall may look like with a full implementation of digital signage:

Hello …

You walk into your favorite mall and are greeted by a digital sign at the entrance promoting a number of special offers at a menswear store. One of them catches your interest—a possible gift for your husband. You could go right there, right now, but that’s not what today’s shopping experience is about. It’s your lunch hour and you are pressed for time. Plus, you can download the information about this special to your mobile and lock in the price for 72 hours. That’s what you do.

Your goal today is a new pair of running shoes. You recently read an article about new lightweight shoe designs, and you want to see what’s available. You are running a five-mile race for a local charity in a few weeks and need time to break them in.

Because you are a VIP shopper, you see a list of promotions and alerts based on your past buying history. You review the list, click on footwear and see a list of stores offering running shoes, special promotions as well your past buying history.

The Convenience of Recognition

You step up to a kiosk, scan your phone and opt to upload your QR (Quick Response) Code—a scannable, 2D barcode that sits on your phone and is encrypted with your purchase history, brand/product preferences and important personal data (e.g., sizes).
Getting a “Virtual Fit”
A tiny little store you never heard of catches your interest. Your smartphone guides you there, and a video wall that puts the entire store inventory literally “at your fingertips” greets you. Using a touch screen and precision, real-time 3D imagery of rendered products, you “interact” with the footwear—viewing the product from every angle, zooming in, and accessing product and technology information, including the recent article that you just read. Narrowing down your choice, you decide to try on two different pairs. Your foot sizes, running style, etc., are already in the system from your QR code. A sales associate brings out your selections, mentions that he read the same article (he was able to review your interactions on his tablet) and provides his own recommendations. After a brief fitting session, you agree. The sales associate rings you up on his tablet and you are on your way.

A Repeat Engagement?
Now you realize you are feeling a bit hungry—it is lunchtime. Fortunately, your favorite restaurant in the mall (alerted to your presence) sent a message to your mobile phone (in your native Spanish) alerting you that your favorite meal was on special. You text your order. At the restaurant, a digital sign invites returning customers to update their loyalty status and win extra points. You log on via your smartphone, enter the code, and see extra points in your account. While you finish your lunch, you realize you have one more stop to make first.

Bringing Online into the Store
Once you have run the race, you are going to want to save the experience by uploading the video of it to Youtube. It’s all part of the charity’s social media strategy to increase awareness. You walk into a nearby consumer electronics store and step up to a sign that allows you to gather and sort information about products (in this case, video cameras) in the same way you might online. You view competitive products, compare features, prices, reviews and more. You narrow your choices, consult with a sales associate and send the information to your husband—he’s going to come by later and make the final decision. When he does, you are going to ask him to stop by that menswear store and see if there is anything of interest.

A New Era Begins
Our shopping experience has come to an end, but when it comes to redefining today’s multichannel retail world and in-store media, we are just at the beginning.

- As in-store and online experiences merge, the opportunities for creating deep, effective customer engagements is expanding. Digital signage is already playing a major role, and it will only grow.
- Interactive signs provide dynamic new ways of presenting products and information, duplicating the online experience in the store.
- Tools such as QR codes and audience analytics support new levels of personalization, making the consumer’s life easier while also providing retailers with unprecedented opportunities for targeting and measuring campaign effectiveness.
- These new solutions enable smaller or regional retailers to compete more effectively “carrying and displaying” full collections of merchandise, virtually, for consumers to browse, select, compare and purchase.
- The role of the sales associate also changes—personal assistance takes on a different context and is enhanced when there is a seamless integration with the delivery of relevant information about the consumer.
10. Making It Happen
Like any important undertaking, digital signage offers big benefits while also posing significant risks.

The underlying technology itself is not really the issue. The displays, media players, software, cabling, etc. are all well understood. The real risks are the losses in time, money resources and competitive advantage from the failure to get a solution that will meet your needs.

Planning, Planning and More Planning
The biggest factor in determining the success of your digital signage effort will be the degree of planning that goes into it. Before anyone outside your organization is contacted, you should have clear ideas about the objectives you want to achieve and the content that will enable you to achieve your objectives. Remember, the underlying technology—screens, players, etc.—are just a means to an end. Getting content right is critical to your objectives and ultimately to making the whole effort successful.

Aligning Your Stakeholders
Digital signage is unusual in that there is the potential for so many different stakeholders to want to have a say in the final solution components and deployment. Getting alignment is critical to these segments:

- IT—ensuring optimal integration with other systems
- Marketing—supporting branding, product rollouts, etc.
- Line of business—creating solutions that address the needs of specific business units
- Customer service—ensuring that the customer engagement is done right
- Finance—putting in place the measures to determine ROI
- Facilities—getting the electrical, cooling and overall design just right

Choosing a Partner
Many of the biggest names in technology are focused on the digital signage market. This includes display manufacturers, PC makers, IT companies and many others. But it’s unlikely you will deal with representatives from any of these organizations. Instead, you will work with a reseller or systems integrator who works with different manufacturers and can put together a solution that meets your needs and objectives.

Key factors in choosing the right partner typically include:

A/V and IT skill sets: Digital signage calls for a combination of audio/visual and data skills. It’s no surprise that the vast majority of resellers and systems integrators have a track record of doing either audio/visual installations (theaters, arenas, video conferencing, etc.) or come out of the data world and know about computers, IP networks, software debugging, etc. Make sure your partner has the skill set needed for your solution.

Digital signage experience: At this point, digital signage is a well-established field. You should be able to find a partner with experience implementing a solution on the scale you are contemplating.

Industry experience: Choosing a partner with experience in your industry may be the most critical factor of all. While you are likely to find partners with expertise in more than one vertical, make sure that one of them is yours. This will put you well ahead of the curve, particularly when it comes to determining the organization and the presentation of content that is often very industry-specific.

User Design: If interactivity is a big part of your digital signage effort, give careful consideration to who will be designing the look/feel and functionality of the user interface.

Content: Once again, it cannot be emphasized enough—you need to line up resources for the development of content.
Now Is the Time to Get Started

There has never been a better time to get involved with digital signage. The technology is proven. New levels of interactivity are creating new and innovative ways to put it to work in your business. And emerging standards make it easier than ever to mix and match components, supporting solutions that are more cost-effective to implement and manage.

Many technology leaders offer computers, media players, displays and other solutions focused on digital signage. There are hundreds of companies that have developed software designed for creating and scheduling content. There are scores of technology resellers and systems integrators that specialize in designing, implementing and managing digital signage solutions.

The opportunities are big. But this is not a medium that is going to stand still. The key is to make smart investments today that will help you grow and evolve tomorrow. Hopefully, this guide has given you a way to get started.


Avoiding Common Pitfalls

A detailed logistics plan can only be undertaken when you know the what, when and where of your solution. But before you even get started, here are overall suggestions on overcoming common pitfalls:

**Bandwidth:** Is your data network ready for transmitting HD video, either live continuous streaming or sending it during off-hours? Get a network readiness evaluation.

**Cooling:** Heat is the most common cause of hardware failures. Choosing quality components is critical. So is providing them with proper ventilation.

**Electrical:** Regardless of what hardware you ultimately install, it’s going to require electrical power. Are there outlets convenient to where you will place your screens (i.e., within three feet)?

**Visibility:** As you begin to evaluate screen placement, look for obstructions or lighting issues.

**Wired or wireless:** Both wired and wireless are options for communication between the media player and screens. Wired tends to be more reliable (no interference), but if the distance is short they can be comparable. Even in the case of wired installations, it is best to keep screens and players in close proximity. When the distance is greater than 25 feet, a video extender is required.

**Wall quality:** Screens, even when they are thin and small, can be surprisingly heavy. Make sure your connections are strong and secure.