

A guide from DigitalSignageToday.com

Digital Signage

Frequently Asked Questions



INSIDE: Digital signage can be complex, but knowing the basics can make it a lot simpler to navigate. Here are the most frequently asked questions about dynamic digital signage — a quick education designed to get you up to speed, so you can ask the questions that you need answered.

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About the sponsors



CoolSign has been powering cutting-edge digital signage for more than a decade. CoolSign offers easy-to-use, reliable, scalable and secure digital signage solutions. The company works with integrators, developers, content creators and hardware manufacturers to provide unique, complete solutions for digital signage deployments.



DigitalSignageToday.com, operated by Louisville, Ky.-based NetWorld Alliance, is the leading online publisher of news and information on the emerging world of digital signage, dynamic messaging and cutting-edge business communication technologies. The content, which is updated every business day and read by professionals around the world, is provided free of charge to readers.

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Introduction

Asking — and answering — the right questions

My friend, Mike White, has installed a lot of systems that we would call digital signage in his career as president of Multi-Media Solutions in Knoxville, Tenn. He's installed many other business communication systems, too, from telephone to video conferencing to every type of corporate Internet and intranet you can imagine.

But digital signage is set apart. White recently told me that digital signage is "one of the toughest A/V installs in the world."

Why is it so tough? Because for systems that frequently have no moving parts, there are an awful lot of variables and things that can go wrong — move out of place, if you will. There are countless stakeholders, each with their own sets of expectations; there are different departments with different views of how technology and marketing assets are best used; there are IT considerations, some of them mission-critical and highly sensitive; and there are the costs, and the sometimes tricky business of getting those costs to reconcile on paper with something that looks like a solid ROI.

There are best practices and established rules of thumb, to be sure, but there still is a lot of room for opinion and experimentation.

People have questions about digital signage — we get them all the time — and naturally so. So it was only natural that we should endeavor to put together a document that would answer as many of them as possible — in Internet parlance, a "DS FAQ."

We surveyed the readers of Digital Signage Today and asked them to tell us the questions that were lingering in their minds about the technology, the application and the business case. We also spoke with people in the industry and asked them to share with us the questions that they hear most often.

We distilled that information into the 40 most frequently asked questions. Then we took those questions to the marketplace and sifted through the results to find and assemble what we hope will be a document of great value to you.

What I find particularly interesting are not just the areas where opinions are shared, but where they differ — look at the question on operating systems, for instance, for an example of starkly contrasting views. There are best practices and established rules of thumb, to be sure, but there still is a lot of room for opinion and experimentation.

Of course, it doesn't stop at 40. New questions will arise all the time — and that's where DigitalSignageToday.com



*James Bickers, contributing editor,
Digital Signage Today*

comes in. Visit us often, and when a new question comes up for you, pose it to us. And we'll find out what the hive mind has to say.

Part 1

The Business Case

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What is digital signage going to do for my store's sales?

This is the key, isn't it? This medium needs to both increase sales and save costs as compared to traditional in-store communications. The solution lies in shopper engagement. From the position and size of the screen to the content displayed on the screen, when properly executed, in-store digital signage can reinforce purchase behavior or create an impulse to make incremental purchases. To accomplish this, the content has to be targeted, the merchandise needs to be close to the message and the call to action needs to be clearly communicated. If you can accomplish that, you can logically anticipate sales significantly greater than traditional signage. Also, it is important to keep in mind that traditional signage typically only has 60-percent compliance. Digital signage can better guarantee 100-percent compliance, so that in itself is a 67-percent performance increase.

– Stuart Armstrong,
EnQii/Digital View Media North America

The Strategy Institute of Toronto reports that in the retail sector digital signage receives 10 times the eye contact of static signage, boosts sales of new products advertised on in-store digital signage by 30 to 300 percent, increases revenue by more than 30 percent for profiled prod-



Today's retail environment is about more than just selling products — it is about providing shoppers with a unique and memorable experience.

ucts and reduces customers' perceived wait times by 15 percent or more.

– Bob Brittan, Symon

Digital signage has multiple applications. It can create awareness, value proposition, price, information, etc., which all lead to increased information, which equals increased sales. Consumers are clever, so the integrity of the content will have a direct effect on the sales uplift.

– Brian Dusho, BroadSign

The challenge in today's retail environment is often about creating a relationship with the consumer by delivering some form of branded "experience," not just products on a shelf. Digital signage done correctly — relevant, engaging

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content delivered within a cohesive retail environment where featured products can easily be located — has been proven to deliver significant lift. Integrating this capability into comprehensive branding and promotional strategies also has the potential to drive traffic across the lease line and build strong customer loyalty leading to repeat sales.

— Brad Gleeson, Planar/CoolSign

In optimal conditions, digital signage can drive an overall lift in sales. Most often, the lift can be achieved through more successful attachment sales, through up-selling and by driving trials of new products or services. It's more common for digital signage to drive purchase shifts, which can lead to higher margin products and can drive greater participation in promotions, which can ultimately lead to a sales lift.

— Jason Goldberg, MTI

Digital signage, aligned with your company's integrated communication strategy, should help you realize your business objectives. Sometimes, to increase sales, a marketing goal might be to increase patron browsing in store by 25 percent. If this were the case, the digital signage could be used to provide the customer an engaging experience that would assist them in finding what they want, give additional product information or maybe a perk like printing a coupon. This sales assistant may provide the additional information needed to help the customer

make a purchase decision, thereby increasing sales. Digital signage should always be thought of in context with your overall marketing communication strategy, the media channels you currently use and what processes will enable you to realize your ultimate objectives.

— David Little, Keywest Technology

The specific answer lies in how you execute your content strategy. Digital signage can do more than simply act as a new advertising channel. It can entice more customers in, extend the duration of their stay, help them find what they want more efficiently, offer advice and alternatives and become an integral part of your in-store experience, all of which should be to the benefit of sales and customer satisfaction.

— Nikk Smith, Pixel Inspiration

Studies have shown that advertisements displayed on digital signage systems at a given venue increase the sale of the advertised item or service. Daypart scheduling helps target specific audiences when their particular time of day or frame of mind is understood — coffee and croissants advertised during the morning rush hours, the new salad special in the food court over lunch, and so on. By using accurate and localized external variables, further targeting of your audience is possible and implements a way to remind them of — and accommodate — their pending need.

— Mike Welsh, AccuWeather.com

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How has digital signage affected traditional product-marketing strategies, especially at the point of sale?

Digital signage has enabled marketing campaigns to be more adaptable to local markets, ensured higher compliance at the store level and, most importantly, enabled the marketing strategies to feature more campaigns and more promotions in a targeted and timely manner, all which can be easily updated to reflect time of day, new products, new pricing, stock status, etc.

– Mike Abbott, ADFLOW Networks

Digital signage technologies give a business a number of key advantages. In addition to being able to more effectively target, change, monitor and manage your marketing and messaging at the point of sale, digital signage technologies give you “perfect execution at retail.” You can now be sure that your information, branding and delivery to the customer is consistent and on-point, as opposed to traditional media that needs to be printed, placed, turned on or otherwise manually delivered.

– Brian Ardinger, Nanonation

Americans call it the last three feet. Getting within the last three feet can really make a difference in swaying people to

buy a product. There is a huge opportunity for marketers to capture this qualified target market — because they’re already in the store — moments before the moment of truth, and close the loop as far as the sales cycle is concerned using dynamic digital signage.

– Bob Brittan, Symon

Studies around consumer shopping habits have shown that the majority of purchase decisions are made in the store, which shows that customer buying decisions can be influenced at the point of sale. With this in mind, the product marketer has an incredible opportunity to answer the questions and objections they know their customers most want answered — what is it, how much does it cost, what does it replace, how easy is it to use, why do I need it, etc. Combine this with the dynamic nature of this medium and it’s possible to test several offers and presentations to determine which message delivers the greatest consumer response. Infinite variations of this approach are possible, only with dynamic digital signage.

– Brad Gleeson, Planar/CoolSign

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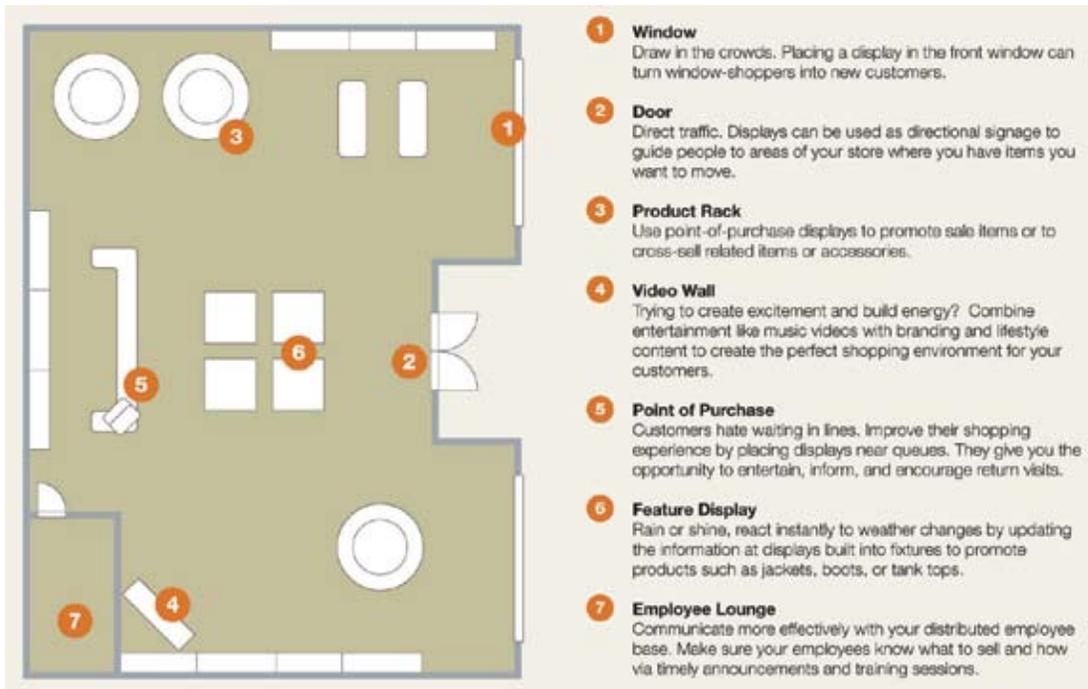
For retailers that have a comprehensive network of digital signage deployed that is well integrated in the retailer's marketing campaigns, digital signage has driven a much more frequent and granular editorial calendar. For example, a retailer that might have typically had four or eight major messaging campaigns a year might find themselves executing 12 to 24 campaigns for a product category well covered by digital signage (this is less true for categories where the physical product still has to be changed or re-merchandised to match the new campaigns). Digital signage has also

changed how retailers work with brands to collect digital assets to use when merchandising products.

– Jason Goldberg, MTI

Because of the ease of changing a message at a moment's notice afforded by the installation of a digital signage network at retail, products can be promoted and promotions changed based on any number of variables including time of day, weather, inventory positions, etc. This is not easily possible using traditional print POS materials.

– Dave Haar, Minicom Advanced Systems



Digital signage becomes a major part of a retailer's marketing strategy, since the screens are closely integrated with the products themselves.

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Don't people just learn to tune this out, like they do static messages?

Bad content can do this. If you assume a customer is going to stand there and watch your message like it was TV, you're sorely mistaken. Like anything else, it's up to the business to deliver engaging and, most importantly, relative content.

– Brian Ardinger, Nanonation

The onus is on the design of the program from the screen, location and the content. TV advertising and other “in your face” or unrelated/non-endemic messaging will at best be ignored and at worst repulse the shopper so they complain or don't come back. On the flip side, relevant and clever messaging that speaks to the consumer's mindset and needs will get noticed and will positively influence shopping behavior.

– Stuart Armstrong,
EnQii/Digital View Media North America

The keys to shopper engagement are still being studied and refined, but there are

several things we know. Customers don't want to go to the store just to be exposed to more commercials, but they do have questions and they will pay attention to a message that is relevant and timely and presented in a way that encourages them to be receptive. Content that gets to the heart of the viewers' questions, or allows them to be informed or entertained while being forced to wait in line, has the potential to be received and influence the consumer. Content and display location that are obtrusive and invasive will cause the opposite reaction. A comprehensive approach to the placement, content and message has a good chance of delivering shopper engagement.

– Brad Gleeson, Planar/CoolSign

Possibly. For now, studies do show that digital signage has better recall than other types of POP. It remains to be seen if that increased recall will be sustained in the long run. If the content on the sign is perceived to add value to shoppers (useful product suggestions, improved finding, entertaining, etc.), then it's likely the benefits will be permanent. If the content is merely disjointed advertisements, or content intended for a so-called captive audience, that the

Content that gets to the heart of the viewers' questions, or allows them to be informed or entertained while being forced to wait in line, has the potential to be received and influence the consumer. Content and display location that are obtrusive and invasive will cause the opposite reaction.

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viewer doesn't perceive value in, then its effect is likely to erode quickly. For the moment, digital signage is the most vibrant message in an ever-increasing arms race of visual clutter, and, as such, even poorly executed messages tend to stand out.

– Jason Goldberg, *MTI*

Effectively produced digital content won't necessarily be tuned out. First of all, a well-designed loop may contain information desired by a viewer, which, depending on the venue, may include news, weather, sports scores, etc. Secondly, dynamic video can and does attract audience attention and great creative proves to be entertaining, as well. One last point to note are the studies that show that digital signage annoyance levels are vastly lower than many other advertising mediums. The relative newness of the medium may contribute to that, but people certainly aren't tuning out today.

– Rocky Gunderson, *SeeSaw Networks*

If the message is catchy and relevant to the audience, there is a good chance that they will linger to see more. As with traditional signs, there is a tremendous amount of importance placed on the layout and placement of the screen/sign. If they can't see it, they won't.

– Dave Haar, *Minicom Advanced Systems*

Yes, no matter what the message,

humans will adapt to it and tune it out. However, not all messages are created equal. There are two kinds of messages, from a consumer's point of view: the annoying or irrelevant messages, and those that are engaging or timely. If digital signs are placed in an area of a store that is known for a high level of customer service and assisted sales, would not such an area benefit from some sales automation? Customers gladly use technology that is helping them with their buying decisions if they perceive a benefit. When customers perceive the message as timely and helpful, they will use the medium because they are solving a problem. The idea of digital signage is to work smarter by communicating better.

– David Little, *Keywest Technology*

Our brains certainly do filter out most messages, especially when the context of digital signage is a retail one where thousands of others are vying for our attention. Digital signage has one or two inherent advantages. First, the medium offers motion — or, more specifically, motion onset — which is highly effective at capturing attention. Second, the medium allows rapid change. This provides a cost-effective mechanism for frequent refinement of your content. Couple this with careful monitoring of the channel's efficacy and you should be able to move toward the sweet spot of audience communication.

– Nikk Smith, *Pixel Inspiration*

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If a digital sign is showing advertisements alone, people will likely tune out a content loop of nothing but commercials. Would you watch a TV channel at home if it offered all commercials, all the time? By bringing relevant, localized, accurate and dependable, need-to-know information to these screens, your audience will begin to rely on your digital signage for their morning news, weather, sports, etc., that are displayed between the quick, 10- to 15-second sponsor messages. When the information is accurate and provided at set times (every 10 minutes), your audience will be more likely to sit through an advertisement or two if they know their five-day weather forecast or weather for today will be displayed next.

– Mike Welsh, *AccuWeather.com*

People have learned to tune out noise. Signage installations are all unique. A POS message will certainly do something different than signage placed in a store window or trade show. There are two parts to good signage in all applications: information and entertainment. If you can't entertain them, give them information they can use. For example, a grocery store — instead of saying "\$8/pound for organic beef" — might do better to put up a holiday menu idea featuring whatever is on special.

– Chris Wren, *The Phelps Group*

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How many people should I have involved in the planning and discovery stages? How many people are too many?

People from each functional area of the business should be involved in the planning and discovery process. This would typically include marketing, store development/design and store operations, as well as the IT group. If these stakeholders are not included from an early stage, there is a greater risk that the planning and discovery process will overlook factors that could have a large impact on the selection and deployment of the right solution.

– Mike Abbott, ADFLOW Networks

Digital signage deployments typically involve multiple stakeholders and influencers mostly revolving around marketing, IT and on-site operations. The key to successful deployments is upfront analysis on the business needs of each group, while matching the desired customer expectations and needs. Having buy-in from these groups goes a long way to understanding and planning for the various objectives to be met.

– Brian Ardinger, Nanonation

At the core, digital signage is a communication medium that can speak to both the shoppers and to the staff. So, the champion for these initiatives should

be the chief marketing officer. Others involved include operations (digital signage can reduce operating costs related to traditional signage), visual merchandising and IT. From an IT perspective, a digital signage network should be designed so that it is unobtrusive to mission-critical data flows and is completely secure. Best-in-breed suppliers understand this and have designed their solutions to ensure that this is the case.

– Stuart Armstrong,
EnQii/Digital View Media North America

The most successful projects I've worked on had a sort of diamond-shaped list of contacts. By this, I mean, in the earliest phases, the cast of characters was quite narrow — maybe two to three people from the customer and a similar number from the supplier. As the project began to gain momentum and require more detailed scope, additional stakeholders and participants were included. Before the final project requirements were determined, the list could get very broad to ensure both buy-in and that no details are overlooked. As the project moved to funding and approval, the list got narrower and narrower until the ultimate decision makers

The key to successful deployments is upfront analysis on the business needs of each group, while matching the desired customer expectations and needs.

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— usually one to three people — signed on the dotted line. The key is to know who the key players are and what their hot buttons are, and to get through the entire process before there's a major re-org and the deck is reshuffled, at which point you often need to start from scratch.

— *Brad Gleeson, Planar/CoolSign*

It's highly dependent on the enterprise. Most often, it's key to get stakeholders involved early who will be instrumental in measuring the value proposition (category managers, merchants, marketing, consumer insight and the in-store staff in test sites), and it's equally important not to get too much early input from operational areas (IT, store operations) until after the fundamental value proposition has been established.

— *Jason Goldberg, MTI*

I think the answer is determined by the size of the company, with representatives from finance, information technology, marketing and executive management involved in the planning stage. Depending on the enterprise, this could be vice presidents and/or directors representing anywhere from at least four to possibly eight people. Over this amount and the project becomes difficult to manage.

— *David Little, Keywest Technology*

You should involve your content pro-

ducers and technicians at the earliest stages. Like everything, this is an evolving field. More options to integrate video and flash elements in digital signage design and management software pop up with every revision. More is not always better in signage, but it is always wise to look for ways to distinguish yourself from the competition.

— *Chris Wren, The Phelps Group*

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What is the typical cost for a small-to-medium digital signage network (fewer than 100 screens), from hardware to software to installation? What can I expect to spend for maintenance and updates?

Using a 50-screen digital signage network as a case study, typical costs for a network of this size should look something like the following (Note that “hardware” includes 40-inch LCD monitors, screen mounts and media players.):

- Hardware: \$200,000 to \$250,000
- Installation: \$75,000 to \$125,000
- Software: \$150,000 to \$200,000 (three-year term)
- Maintenance and updates, hardware: \$1,000 to \$2,000 per month (three-year term)
- Maintenance and updates, software: included

– Mike Abbott, ADFLOW Networks

Costs can vary dramatically among types of deployments, but the component costs are typically similar. You’ve got the obvious screens and media-player hardware costs (these are typically the bulk of the deployment costs). Next, you have some software licensing fees, set-up and installation fees and ongoing content management and support costs.

– Brian Ardinger, Nanonation

Retailers want to avoid capital costs and many don’t even want to own the hardware in fear of having to maintain and replace hardware once it becomes obsolete or dated-looking. Best approaches are ones that can bring it all down to a per-location, per-month, “all in” cost that includes all the initial costs, the network management and ongoing support. It can also include content and programming. For programs like that, cost can range from \$100 to \$1,000 per location per month when the retailer has multiple locations.

– Stuart Armstrong,
EnQii/Digital View Media North America

A typical installation with a 32-inch screen, PC/appliance, cabling, installation and software will cost an average of \$2,000. The pricing increases as the screen sizes increase.

– Brian Dusho, BroadSign

This is an important question that I frankly believe can not be accurately answered in a one-paragraph summary. Lots of people can quote the cost of a 40-inch class plasma or LCD, small PC player, signage software platform and “hang and bang” installation. I don’t believe a decision to build a network or choose a supplier partner should necessarily be based primarily on these numbers. For budgeting purposes, \$3,500 to \$5,000 per screen, depending on size and quantity, is probably close enough. The more important questions are prob-

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ably: What will high-quality content and network management cost? What is the break-even timeframe for my network? How will I measure success and ROI? How will I justify network expansion? How much will my network contribute to the success of my business? I think these are the more meaningful numbers.

– Brad Gleeson, Planar/CoolSign

It's highly dependent on the type of display hardware and the quantity/frequency/granularity of content. For rough budgeting numbers, I suggest \$6,000 per screen for hardware/software/installation/project management, \$100,000 to \$150,000 a year for content development and content management (assuming some amount of asset reuse and some purpose-built assets, with four major and four minor updates a year) and \$600 to \$1,200 a year for on-site service contracts and proactive maintenance.

– Jason Goldberg, MTI

Maintenance costs are divided between the physical equipment and network infrastructure, as well as the software. Content updates will require support, as well, and cost associated with content update will depend upon the media and types of content being deployed.

– Dave Haar, Minicom Advanced Systems

You can turn a screen on for about \$5,000 on average for a small- to medium-sized digital signage system. This includes a medium-size screen (42 inch),

installation, wiring, testing and training. To maintain the system, figure about 20 percent of that cost per year.

– David Little, Keywest Technology

You should plan on investing a minimum of \$250 for small screen and \$500 for large screen (over 37 inches) installs per screen for data cabling and installation and another \$200 to \$800 for electrical work, if needed. Many times, installations outside of your local area will also require a site survey, which is much less expensive than traveling to the site yourself. With this survey, you can collect all pertinent information for the site as well as digital images to help make placement decisions. Maintenance calls for digital signage are very rare; however, every once in a while a service call is needed to update software if it cannot be handled remotely or damage has occurred to the unit. For budgeting purposes, play it safe and plan on two calls per year at \$200 per call.

– Jeff Metzger, Rhombus Services

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What are the typical costs for digital signage software?

Software costs vary and can range from \$200 to \$1,000 per screen, based on volume and desired functionality.

– Brian Ardinger, Nanonation

A robust content-creation and management software (including scheduling and reporting) can start at approximately \$3,000 and go up from there, depending on the number of users (editors), locations, centralized or decentralized display control and addition of other information or data sources (news, weather, etc.).

– Bob Brittan, Symon

Like most business purchases, the answer is: it depends. Certainly, estimates of \$500 to \$1,500 for a player license is a good budgetary number for a reasonably powerful and reliable player node. However, you have to consider things like the network-controller software, content-management software, monitoring services, content-creation tools, dynamic database-updating software and the like. Often, customers are sold on the cost of the player software since this is closest to the screen, but the real power can usually be found in the central management server software. Depending on the sophistication of these tools, much of the real power

and benefit of digital signage can either be realized or the network can turn out not to be scalable or secure. Reasonably good player software can be pretty cheap, but, when linked to non-scalable, non-enterprise-class server, can sometimes lead to disaster.

– Brad Gleeson, Planar/CoolSign

Most of the well-known commercial software packages sell for \$1,000 to \$1,500 per node. This is largely due to the relatively small number of software licenses that have been sold to date. Ultimately, this price must get well under \$500/node to be practical for most retailers.

– Jason Goldberg, MTI

The cost of digital signage software ranges from about \$300 to around \$2,500 for the most sophisticated. Keep in mind this is for a single license. Most digital signage systems are sold as a package, which includes discounts for multiple licenses.

– David Little, Keywest Technology

There appear to be three clear pricing bands emerging. At the lower end, from zero to \$250, you have basic media players that will allow local scheduling of pre-created media. In the medium bracket, up to \$800 per player, are a whole host of solutions that typically provide more advanced scheduling, management and playback options, combined with centralized control of the network. At the top end, from \$800

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to \$1,500 per player, are solutions that include many more functions in addition to advanced scheduling. These may include interactive capabilities, real-time rendering of content, dynamic data integration, real-time triggering and very large-scale deployment architectures for networks with thousands of players.

– Nikk Smith, *Pixel Inspiration*

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Should my main expert on this project be an IT person or a visual communication expert?

The main champion for the project should be the business owner for the medium. While it will vary from organization to organization, this is usually the store's marketing person. While IT and visual communications people may be key subject matter contributors, it is the person with the overall vision and strategy responsibility that should lead the charge. They need to own the strategy, the funds and the need to succeed.

– Mike Abbott, ADFLOW Networks

Both should be involved, but assuming you've chosen a proven vendor who has deployed and supported successful networks, ultimately the content and messaging will be the driving factor for ultimate success.

– Brian Ardinger, Nanonation

You will definitely need the services of both, and do not, by any means, exclude the IT person from any upfront discussions on a digital signage implementation.

– Bob Brittan, Symon

While IT expertise should play an important role for implementing a digital signage network, I would rely on the visual communications expert to oversee the

project, since content and effectiveness are the keys in initiating a successful digital signage project.

– Jimmy Dun, Dynasign

Having a well-thought-out content and message strategy is essential to delivering the impact and benefit of digital signage to the customer. If the content is poor and ineffective, the system will fail. In my experience, the importance of a sound network and IT strategy is to ensure first that the digital signage network will have no negative impact on essential IT operations first — such as billing or inventory management. In this way, IT can often wield “veto power” over a signage network. If you are fortunate enough to engage your IT staff at a point in the process where they gain “ownership” of the project, and you work with a software platform that is secure and IT-friendly (which many are not), then you can gain efficiencies and reliabilities that only a committed IT staff can deliver.

– Brad Gleeson, Planar/CoolSign

You shouldn't have a “main expert.” It's fine to have a single champion during development/testing, but once an enterprise commits to deploy a digital signage network, if the network still has a single champion, it's probably doomed to fail. In deployment, digital signage is a tool used by the visual merchandising department, and it needs to be serviced by IT and by store operations departments.

– Jason Goldberg, MTI

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Ideally, it should be a visual communication expert. The network's technology selection process should be driven primarily by the needs of the content strategy.

– Nikk Smith, *Pixel Inspiration*

You need both. Signage can be as simple or as complex as you make it. Don't be "penny-wise, pound foolish" with this — get a great visual team together, preferably people with experience in TV. Digital signage, like TV, is usually a one-sided communication. When people see a TV (or flat panel) — some part of them expects to see TV, so give it to them. IT is of equal importance. Maximize your opportunities for remote management, monitoring and delivery. It will make your life so much easier and is simple to do — if you get your IT people involved at the early stages.

– Chris Wren, *The Phelps Group*

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How realistic is it to expect to generate ad revenue? And does it ever make sense to mix ad sales with branding/informational content?

Look around you — brands are looking for every opportunity to grab consumer mind share from wrapping city buses to sponsoring stadiums. In-store digital signage offers the unique opportunity to get mind share and market share at the same time. Recency, the juxtaposition of a branded message with the point of decision, can replace frequency and it gets consumers to reach out and buy a product. Also, it blurs the line between advertising, promotion and product information. So, yes, there can be a mix because they all come together to change shopping behavior.

– Stuart Armstrong,
EnQii/Digital View Media North America

There are really two kinds of signage networks: those that deliver direct revenue (advertising) and those that don't. And then there is all that gray area between the two. Clearly, digital signage is being embraced as a new advertis-

It is realistic to generate revenue; PRN and others have done it. The better question is: should I be trying to generate revenue?

ing medium in both out-of-home (think airports, shopping malls and billboards) and branded retail (think Wal-Mart) environments. It is very realistic to generate ad revenue if the system has been designed for it and offers a venue and demographic that advertisers will pay for. Furthermore, it is absolutely critical that the network mix some branded content and infotainment with the advertising content if you want people to consume it — think CNN airport news. The only exception to this would be the established out-of-home applications such as digital billboards, bus shelters and airport signs. But don't think this is automatic. You have to be able to prove to advertisers the value of your locations in terms they understand — demographic, dwell time, frequency, proof of play. And selling advertising to national brands is best left to the professionals, even if it means you have to share the revenue.

– Brad Gleeson Planar/CoolSign

It is realistic to generate revenue; PRN and others have done it. The better question is: should I be trying to generate revenue? And I say the answer is no. Retailers are in the business of matching up shoppers with products and making money on the resulting transaction. That is exactly what the mission of the digital signage should be. Once the sign starts getting viewed as a separate revenue stream, it's inevitable that ad messaging will conflict with the store's

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visual communications plan. Very often, the revenue the sign generates is co-op or merchandising accrual funds that the brand has already earmarked for use by the retailer; in those cases, it's usually a zero-sum game in which retailers will get those funds with or without the digital sign.

– Jason Goldberg, MTI

Most digital signage owners are keenly interested in the question of potential ad revenue. Opportunities certainly exist to attract advertisers. The greatest current challenge as an industry is defining a set of standards by which this medium is bought and measured. As the industry develops those standards, the real challenge facing individual networks is reaching a critical scale to ensure it's attractive to an advertiser. In growing those numbers (of locations), it absolutely makes sense to consider branding and informational content, as well as creating a mix of national and local advertisers. Informational content helps to draw audiences to the screens, making the advertising more desirable and effective.

– Rocky Gunderson, SeeSaw Networks

Depending on your environment and the number of eyes you have the potential to see, your message will determine whether relying on your digital signage



Advertising dollars can often be generated from on-screen real estate, but companies need to be realistic in their expectations.

network for ad dollars is realistic. Many digital signage deployments don't make sense to use for advertising purposes as they are primarily used for information and educational purposes. It is absolutely OK to mix information with advertising content — again, in environments where it makes sense — hospitality, medical, entertainment, educational, transit systems, etc.

– Dave Haar, Minicom Advanced Systems

These kinds of questions are very valid, but are difficult to answer in the short space provided here without knowing a lot more about the context of the ques-

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tion. The quick answer is yes, it may be very realistic to expect ad revenue, but this depends on your ability to leverage the system. It may be silly or it may make sense to mix ad sales with branding or informational content, but this may be best determined by the situational variables at hand.

– David Little, *Keywest Technology*

It's very realistic to generate ad revenue from digital signage; it's happening now. Traffic studies are available through a number of sources; when the traffic and number of impressions is known, a CPM (cost per impression) can be generated. Whether it's local, regional or national advertisers, digital signage can without doubt be a generator of advertising revenue. Regarding a mix of ad sales with informational content — as far as we are concerned, this is a must. Display local, relevant, up-to-date, attention-getting information that people can count on, interspersed with some sponsorships, and you have your residual audience (impressions) and your advertising pitch. According to Arbitron, 58 percent of riders consider Transit TV to be one of their regular sources for weather and news information.

– Mike Welsh, *AccuWeather.com*

Mixing messages in visual communication is almost required nowadays. Keep in mind, your digital signage most likely is displayed on a flat-panel display that is 32 to 65 inches. That's the same size

people have in their homes. And, in their homes, they watch news programming with sidebars and tickers all communicating something different. They can handle it. In fact, they almost get bored if you do not send them two or three messages at once.

– Chris Wren, *The Phelps Group*

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How do screen owners determine their ad rates — and how do those rates compare to other advertising venues?

This is an area that is just now receiving the attention it deserves. Media agencies such as Nielsen and POPAI are close to completing significant studies into DS and OOH rate methodologies that will allow this medium to be priced and compared with other traditional media.

– Mike Abbott, ADFLOW Networks

Mass market is mass market. If a non-endemic ad is playing in a public venue such as a mall or along a roadside, it will be bought on the same basis as any ad



Calculating CPM is as much art as science.

buy and get a typical mass-market CPM. But that is not the power of in-store digital signage. In that environment, brands will pay a significant premium if you can demonstrate conversion in the form of product uplift or opting into a branded community; the latter can be done through SMS or IVR (interactive voice response technology).

– Stuart Armstrong,
EnQii/Digital View Media North America

Ideally, screen owners would charge whatever the market will bear. We've seen rates in the \$600 to \$800 per slot.

– Jason Goldberg, MTI

The calculation of CPM for most media models is as much art as science. You need to start with as much info as you can gather about how many people will see the display in a set period of time, usually a month, but sometimes shorter. You then need to collect detailed demographics — age, income level, gender, etc. — on these viewers. Try to determine how long they watch the displays — are they sitting in a waiting room or driving by? From this, you can calculate metrics that can be used to compare your sign to similar media buys in your market. Even armed with that data, be prepared to live with a lower revenue level unless you can deliver a significant network effect — think hundreds of signs. The good news is there are advertising sales brokers who can help you figure this out, in return for a cut.

– Brad Gleeson, Planar/CoolSign

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If I sell ad space on my digital screens to my brands, won't I just lose the co-op dollars they're already spending with me?

For retailers who voice this objection, we recommend that they be aggressive in adopting new marketing initiatives of all kinds, including digital signage, or else they will run a greater risk of losing their co-op dollars to others competing with them. Vendors and brands are looking for good ideas to drive incremental business and DS can deliver this. Retailers are best to secure these co-op dollars for themselves, or else the vendors/brands will take their co-op dollars and spend them elsewhere altogether.

– Mike Abbott, ADFLOW Networks

This is primarily an issue in grocery and drug retailers where trade spending has become essential to their financial reporting and performance. In other retail channels, such as apparel, consumer electronics, home furnishings, etc., co-op dollars are more purely used to drive consumer traffic to categories and increase sales of a particular brand, incremental to the baseline — in other words, not just shifting sales from one brand to another. In those environments, co-op, market development funds (MDF) and advertising dollars can be channeled effectively into digital signage messaging by the brand. Also, keep in

mind the retailer is the ultimate brand. Retailers that are looking at building strong brand identity and loyalty are using digital signage to get their messaging and consumer value proposition to the shoppers. Also, promoting their store brands drives loyalty and higher margins.

– Stuart Armstrong,
EnQii/Digital View Media North America

Unless you are Wal-Mart, co-op tends to be a zero-sum game. You get the same money regardless of what you spend it on. Better to treat digital signage as the incremental revenue generation it is. By this, I mean, either sell advertising to folks you don't already get co-op from, or create scarcity that encourages your partners to compete for this valuable commodity using non-co-op dollars. It can be done if you can create content that delivers meaningful sales lift. And isn't that what you got the network for in the first place?

– Brad Gleeson Planar/CoolSign

In many cases, yes. In some cases, there are unallocated co-op dollars available to a brand's account team that

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the team can spend amongst multiple retailers at their discretion, and it's possible for digital signage to earn some of those dollars. Only when you're getting a piece of the advertising budget from the marketing budget of a brand (vs. from the sales account team at a brand) are you really earning dollars that wouldn't otherwise be available to you.

– Jason Goldberg, MTI

I would not look at digital signage as a replacement of other media channels. In most cases, digital signage is an addition to your other media channels, which should increase your co-op dollars.

– David Little, Keywest Technology

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What are the pros and cons of having my digital signage network managed by a third party?

The question is simple: What business do you want to be in? If you believe your value add is in your ability to aggregate and manage content delivery and advertising to your digital signage network and are prepared for this investment of resources, you should absolutely do it. The control and the additional profit are strong attractors to this model. On the other hand, if your expertise lies more in the sales and business development side of the equation, a qualified, experienced third-party network operator can deliver tremendous peace of mind. These networks are complicated and temperamental. It helps to have technical folks on your team who have seen it all before and then fixed it. Often, it's a migration that happens over time, where the network is managed internally until it gets to a size and complexity where it makes sense to outsource.

– Brad Gleeson, Planar/CoolSign

A third party can offer more scalability and redundancy. They can have a greater core competency, a wider diversity of capabilities and can be a faster and safer way to get started. In the long run, if digital signage is to be a core part of your marketing mix, it's important

that it be an internal core competency. A third party can be a great way to start, but be sure that hardware, software and services can all be taken over when and if it makes business sense for you, and make sure you know what all the costs will be to do so, before entering an agreement with a third party.

– Jason Goldberg, MTI

Pro: Many competencies are involved to successfully manage a digital signage system. A competent network manager will have technical know-how as well as a broad background in marketing. Content proficiencies should include experience in commercial television advertising, Internet ad designing and animation. Con: Good partners in any business are hard to find.

– David Little, Keywest Technology

The pros: You don't need to find resources internally; you have an "off-the-shelf expert" to rely on; it's in their interest to ensure that your network performs; and they will have all the tools and experience of running such a channel. The cons: The cost; you're typically tied into a 12-month minimum term; major changes may be subject to extra charges; and the supplier's capability to

It helps to have technical folks on your team who have seen it all before and then fixed it.

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perform timely updates may not necessarily meet your internal needs.

– Nikk Smith, *Pixel Inspiration*

I prefer a mix of the two: Design and program locally, deploy and manage remotely. A third-party vendor will likely have a very powerful backbone for signage delivery and management. These services are not cheap — but they're not ridiculously expensive, either. And, if you have a concern about not being able to execute changes instantly, your integrator can most likely provide your IT people with a simple set of instructions that can “push” your updates to your signage.

– Chris Wren, *The Phelps Group*

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What's the best way to engage older customers, who are probably not as used to digital media?

Digital media shouldn't be looked at as fundamentally different than other ways to engage and attract customers. Digital technologies give the marketers more arrows in their quiver to use, like motion or perhaps sound, in addition to the ability to manage, monitor and ultimately change and test messaging in ways that are not possible with traditional media methods.

– Brian Ardinger, Nanonation

I rely heavily on reference accounts and the power of successful existing customers. Most business people are constantly looking for ways to differentiate and improve their business. Communicating to prospects about recent high-profile installations, some of which may mirror their type of business, is the best way to generate interest. There's plenty of market data and "industry news" that you can refer to if you don't have a lot of existing customers to reference. The idea is that nearly every business can benefit from digital signage, whether it's customer-facing or internal corporate communications. Often, it's just that your clients have been exposed to or approached with ideas about how their business might be able to use and ben-

efit from this exciting, new technology. You may also consider an "open house" with your digital signage supplier to introduce the concept to a select group of invited prospects. You may be surprised how many of your clients are already considering digital signage — they just didn't realize they could get it from you.

– Brad Gleeson, Planar/CoolSign

Passive digital signage (i.e., signs without a user interface) isn't intrinsically friendlier to any particular age segment. Color TV was launched in the U.S. in 1957; a 70-year-old shopper has been living with color images on a video display since they were 10 years old. What is key to make digital signage effective for older shoppers are the same things that make static signs effective (and which signage designers often get wrong). Older eyes need more contrast; their color perception is skewed to yellow; and they need large images to overcome deteriorating vision.

– Jason Goldberg, MTI

Don't wow them with the technology. Test it on children first, then on senior adults. If a child of 5 to 7 years of age

Digital media shouldn't be looked at as fundamentally different than other ways to engage and attract customers. Digital technologies give the marketers more arrows in their quiver to use.

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is intimidated and confused by the sign, most likely senior citizens would be, too. I think the KISS principle should be in full effect — Keep It Simple, Stupid.

– David Little, *Keywest Technology*

An effective content strategy is the place to start. There are many visual techniques that can be employed to help gain acceptance and attention from a specific demographic. Psychographic profiling is often a good place to start, but simple visual tweaks can often make content more engaging.

– Nikk Smith, *Pixel Inspiration*

Attract and engage older customers with informational content that they want and need to know. Local weather is the No. 1 reason why audiences tune into the local news. Show older customers what they want while they wait in line at the bank, the doctor's office or at the grocery store, and then their attention is captured and another impression is gained toward the value of your advertising.

– Mike Welsh, *AccuWeather.com*

Remember, digital signage has more in common with TV commercials than with print and outdoor. Older customers watch a lot of TV. So talk to them like you talk to someone on TV — except you're not filming anything, and it's likely you're not using sound.

– Chris Wren, *The Phelps Group*

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Have there been any documented studies or reports on sales lift and revenue increases as a result of digital signage?

There have been several studies, but they have been commissioned by private parties who aren't interested in offering them to their competitors to reference. Certainly, our company has done this on more than one occasion. You may be able to get access to this data through your supplier partner. POPAI has data that is based upon the power of "point of sale" as opposed to digital signage. POPAI in Europe has some more specific studies that were done specifically for a retail store client (ASDA, I believe). This is one of the more glaring needs this industry requires and I know it is being addressed by several of the industry associations.

– Brad Gleeson, Planar/CoolSign

I'm not aware of any publicly available studies that demonstrate sales lift. It's well known that a number of individual retailers have studied the sales effect for their own network, and understandably they don't share the results with their competitors. Former Levi's executives have presented data showing an 11-percent lift in sales for Levi's products in JCPenney using an interactive digital sign (a sign which also dispensed promotions). There are several studies that

Former Levi's executives have presented data showing an 11-percent lift in sales for Levi's products in JCPenney using an interactive digital sign.

show increases in recall, brand affinity, etc., such as the Arbitron report in Simon malls.

– Jason Goldberg, MTI

Many organizations have been documenting sales lift and revenue increases for about the past five years. Some of these organizations include APCAD, Canadian Out-of-Home Digital Association, the Digital Signage Association (DSA), Dynamic Signage Consortium, International Sign Association, Out-of-Home Marketing Association of Canada, Northwest Sign Council, Out-of-Home Video Advertising Bureau and POPAI Digital (Australia and New Zealand).

– David Little, Keywest Technology

Yes. POPAI and other industry bodies are the best places to start for these sorts of statistics.

– Nikk Smith, Pixel Inspiration

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When is a digital signage project considered a success?

Deploying digital signage technologies is just the beginning. Like any other media or method for engaging and communicating with customers, it is an ongoing tool that is only as good as long as it is delivering results.

– Brian Ardinger, Nanonation

This is such a key question. I often tell clients that the first objective in considering digital signage is defining quantitatively how they would define its success. Is it sales lift? Is it perceived reduced wait time? Is it a reduction of customer service questions? There are so many of these metrics that could be applied, it is essential the customer build this success model in advance precisely so they can know how close to success they are after each iteration of new content and display placement. This is typically different for every customer, but you will gain tremendous credibility if you simply start your proposals to your clients with this question.

– Brad Gleeson, Planar/CoolSign

For your vendor, it's usually a success the day you issue the purchase order or the day the network is installed. The real answer is to set success criteria in advance (ROI, sales lift, increased margin dollars, brand recall, customer

satisfaction, perceived wait time, consumer intent to spend, conversion ratio, attachment ratio, etc.) and to judge the success of the project based on those criteria, often at least 12 months after initial deployment.

– Jason Goldberg, MTI

Success will be determined by the environment in which a digital sign is placed. The questions to ask to determine success might be — are my digital signs getting the message I want to get across to the people I want to get it across to and are they producing the behavior I am looking for in my audience?

– Dave Haar, Minicom Advanced Systems

Digital signage is a success when it delivers the results of the objectives set by a company's marketing department or any other objectives established by various departments including finance, communications and management.

– David Little, Keywest Technology

As I see it, digital signage is like a little gift to consumers. When it is executed well, a customer leaves with “something.” Should you expect a customer to pick up a phone or log on to a Web site after they see your message? Not really.

As I see it, digital signage is like a little gift to consumers. When it is executed well, a customer leaves with “something.”

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So how can you measure success and impact with no verifiable metrics? They should leave the signage with information. If your signage is in a window, you want to give them a reason to come inside. If your signage is at the POS, you want them to consider other purchase options for their next visit.

– *Chris Wren, The Phelps Group*

Part 2

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What is the effective life of LCD and plasma screens?

There is mounting evidence that commercial flat-panel LCD and plasma TVs have been highly reliable products requiring few repairs during the first three years of their use. The small percentages of sets that have problems are typically covered for free by the manufacturer's warranty. Advancements in technology have made both LCDs and plasmas even more affordable, and users will want to take advantage of new features including better picture quality and sound (HDMI) by upgrading their sets every three to four years.

– Bob Brittan, Symon

Both LCD and plasma are rated around 55,000 hours MTBF (mean time between failures). However, the LCD goes bad in the form of one pixel at a time, while plasma (goes bad) in the form of a black line.

– Jimmy Dun, Dynasign

Many manufacturers will quote product-life figures in terms of hours to half brightness or mean time between failures. The more critical question is really around the "use model." In other words, how will the display be used and what sort of environment will it be exposed to? If this is a restaurant with grease and

heat, the demands on the display will be different than in a commercial lobby that may only be open 40 to 50 hours per week. What if the display is exposed to UV, or is installed in an outdoor environment or is mounted inside a moving vehicle like a train or a cruise ship? Unless you intend to use your display as a "TV," the first rule is to only use professional, commercial displays for maximum life and performance. If you have a demanding application, consider looking for specialized industrial display products designed specifically for extended use or hostile environments. These products are available from Planar as well as other vendors and pay for themselves in performance and reliability. Typically, when specified correctly, the currently available displays will deliver more-than-acceptable useful life, if not outlive the deployment entirely.

– Brad Gleeson, Planar/CoolSign

Twenty-five thousand hours for a high-quality, industrial-grade panel, which is just short of three years. Industrial panels have clearly proven to have a greater service life than the cheapest consumer monitors, but very expensive panels specifically for digital signage actually haven't demonstrated a better service life than a typical industrial panel.

– Jason Goldberg, MTI

The effective life of LCD and plasmas vary significantly. Part of the equation is based on the panels' mean time be-

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tween failures (MTBF), which can vary from 40,000 to 80,000 hours. The rating is typically lower on consumer-grade panels and higher on industrial-grade panels. Brightness is also a variable between the two technologies that gives LCD an edge over the life of the panel. Plasma panels have a degrading luminosity that is usually measured at the 50-percent point. On the other hand, LCD's brightness is measured according to the bulb life expectancy, which has only minor brightness degradation during its lifespan. Depending on the initial quality rating of MTBF and brightness, LCD or plasma panels should last between four to eight years of daily use of 12 hours or less.

– David Little, *Keywest Technology*

Until recently, plasma screens had a much lower life expectancy than LCDs. However, they have now virtually caught up, and life expectancy is no longer an issue for plasma screens. However, life expectancy is measured differently for LCD and plasma screens because of the way in which they deteriorate over time. An LCD display will work as good as new until the day it dies, but a plasma screen's brightness will fade over time. The life expectancy of a plasma screen is the time that it takes to reach 50 percent of the original brightness it started with, so a plasma screen constantly loses brightness and deteriorates gradually instead of simply shutting off when its end of life has been reached.

– David Roscoe, *ADFLOW Networks*

Typically, 30,000 to 50,000 hours — i.e., up to five years — but this varies per screen. Turning off and on the screen can reduce the life of the screen; it is recommended that scheduling software allow for screens to go black (half off) during off hours to extend the life of the screen.

– Michael Willems,
EnQii/Digital View Media North America

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Are there any specific applications where either LCD or plasma is superior?

LCD displays are generally brighter than plasma sets and have less reflective screens and are, therefore, better for brightly lit conditions. They are not prone to burn-in or static images, as plasma TVs are, and they consume less power. Plasma TVs have a wider viewing angle, a plus when there are multiple viewers, and offer deep blacks, high contrast and realistic colors resulting in rich, natural images, especially in rooms that are dimly lit. Plasmas are also better at showing fast-moving images if you are considering the use of video clips in your digital presentations.

– Bob Brittan, Symon

Plasma has far superior display quality and more brilliant color, particularly when playing fast-moving video contents. While LCD is more suitable for static and animation contents such as menu boards, retail applications and directory information, plasma should be a primary consideration for applications that are heavy on full-motion video content, such as sports bar and theater digital signage networks. One of the main issues with LCD is the slow “dim time,” which causes the ghost shadow behind the fast-moving object in video.

– Jimmy Dun, Dynasign

The general rule of thumb is: 50 inches and larger, plasma will be a better value; 42 inches and smaller, LCD generally leads. If the requirement is for cinematic video quality, plasma is preferred. For data and graphics, LCD excels, especially at high resolutions. LCDs are lighter and use less electricity than plasma. While plasma has gotten a reputation for being susceptible to burn-in, the reality is that either technology can suffer from image retention if not handled correctly and that improvements in plasma have greatly narrowed the gap in this performance between the two. At the end of the day, the technology is a tool. Projects should be approached with an emphasis on the goals and objectives first, and then the technology selected based upon which can best deliver these requirements.

– Brad Gleeson, Planar/CoolSign

Plasma is not recommended at high altitudes (starting at 6,000 feet to 7,500 feet, depending on brand), as the pressure differential requires greater cooling (fans get noisier and energy draw gets higher). Plasma can have burn-in issues (less so with the latest generation). Plasma generally still has a slight

The general rule of thumb is: 50 inches and larger, plasma will be a better value; 42 inches and smaller, LCD generally leads.

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edge in contrast (blackest blacks), better extreme viewing angles and slightly better overall color gambit. LCD can more easily achieve higher resolution, be more energy efficient, have a replaceable backlight, but is more expensive in a given size.

– Jason Goldberg, *MTI*

LCD technology takes the lead in displaying saturated graphics derived from RGB or DVI sources with greater clarity and less noise. On the other hand, video-originated footage, specifically HDTV content, has a richer, more vibrant appearance on plasma technology.

– David Little, *Keywest Technology*

Sure, though this is personal preference, as well. In general, plasma gives brighter, more vibrant colors, but it uses more power and can “burn in,” so it is not the immediate choice for split-screen-type displays, or displays with a logo in the same place of the screen at all times.

– Michael Willems,
EnQii/Digital View Media North America

For any application that is less than 42 inches, an LCD is probably your best option. And if you do not care about a high-quality image, LCD can be a more economical choice — as what you save in dollars with LCD, you also reduce your image quality. There is a fundamental difference in the way LCD and plasma produce an image. If you want your signage to really “pop” and you

have a design that employs rich media and beautiful images, plasmas with sexy images will make customers take a second glance. It looks that good, especially on the new, large-format plasma displays.

– Chris Wren, *The Phelps Group*

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How do I determine the proper screen size for a given room?

Depending on your application, don't skimp on screen size. For example, a shelf display might be only 5 inches, but any main display should be at least 42 inches. In large rooms and open areas, go for a 50-inch or larger set. For additional impact, you may even want to consider an attention-getting video wall.

– Bob Brittan, Symon

Several considerations go into choosing screen size and placement. Often, it's important to first map out traffic patterns for the space you are working with to determine preferred "sight lines" for your displays. Also, there's a certain amount of interior design that should be applied to ensure placement of screens is consistent with the overall design of the location. Many networks have experimented with screens hung high over shopping lanes to small screens located right at the shelf edge of the products being displayed. Again, you must first have a clear picture of what the customer is trying to accomplish. Content design must then take into consideration these sight lines and interior design elements to ensure the content is viewable and readable. In terms of screen size, one rule of thumb is that the ideal viewing distance of a screen is between two-and-a-half and four times the screen width.

– Brad Gleeson, Planar/CoolSign

For retail digital signage applications, this must be determined in the target deployment environment. Where will the screen be mounted? Where will the shopper be when they are expected to receive the message? Test messages on the screen using a focus group from the target demographic and ask them to read the sign under ambient light during normal store conditions. If natural light is a component of ambient light, the focus group should be conducted multiple times throughout the day. There is a lot of good research on sign legibility, which is all applicable to digital signs. A very simple rule of thumb is that letters need to be at least one inch high for every 20 feet of viewing distance. So, start by determining how much content you need on a screen, then determine your viewing distance, and you'll be able to calculate how large a screen you need to fit text at that distance.

– Jason Goldberg, MTI

First, determine what the viewing distance is going to be. As a general rule in the signage industry for minimum impact,

A very simple rule of thumb is that letters need to be at least one inch high for every 20 feet of viewing distance. So, start by determining how much content you need on a screen, then determine your viewing distance.

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The size and shape of the ideal digital sign are driven by the location, the purpose and the content.

you need at least 1-inch text for 25-foot viewing. Next, determine what level of impact. Medium-level impact might be 4-inch text, with high impact around 6 to 8 inches. Finally, determine how much text needs to be on the screen at any given time. From this simple formula, one should be able to make an educated guess to how large a screen should be for the level of impact required.

– David Little, Keywest Technology

There is no proper size/space ratio. For standard signage, there are many documents available about “optimum viewing distances.” If you are installing multiple displays in a superstore/warehouse store,

you should consider how far from the aisles the screens are placed. But, for the average installation, keep in mind that your signage can become an architectural element of the room. Don’t just put it on a stand somewhere — really make it seamless and integrated into your space.

– Chris Wren, The Phelps Group

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Do I need any proprietary hardware or software?

You probably will, as most vendors have proprietary hardware in the form of a media player, much like your cable set-top box, which will display your shows on your screens. There is also the very important content-creation, scheduling and reporting software. Select a vendor with products that are using industry-standard software and hardware components. This can lower your costs and take advantage of all of the new, exciting graphics capabilities that will really enhance the information or advertising you want to display on your flat-panel screens. Most vendors' products work with all of the name-brand flat-panel screen manufacturers.

– Bob Brittan, Symon

The digital signage industry is going through a significant transition, I believe, from systems consisting primarily of off-the-shelf products and technology to more specialized products and systems designed specifically with the needs of digital signage customers in mind. I believe this is a natural and positive transition that will lead to more reliable, more powerful and ultimately more cost-effective solutions for customers. Early digital signage systems consisted of disparate bits of AV and PC and graphics and networking. Today's solutions are much more likely to be purpose-built,

integrated products designed solely for the purpose. So the message is: don't fear proprietary hardware. Instead, be sure the products are based upon sound industry standards and come from a manufacturer that has a track record and service reputation you can depend on.

– Brad Gleeson, Planar/CoolSign

There are many successful digital signage projects that don't use any propriety hardware, and even a few that don't use propriety software. However, there will often be a number of functional advantages to propriety solutions that will make them advantageous for digital signage projects.

– Jason Goldberg, MTI

If you don't have any specific digital signage management objectives other than to loop media, off-the-shelf media players and software may do the trick. If you want to manage media with schedules, develop segmented screens, control from remote locations, monitor operations or tie media playback to sales operations, this requires using proprietary software and maybe hardware that are designed to fulfill your specific needs.

– David Little, Keywest Technology

Don't fear proprietary hardware. Instead, be sure the products are based upon sound industry standards and come from a manufacturer that has a track record and service reputation you can depend on.

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In the case of digital signage, we feel it is best not to use proprietary hardware. There is no real advantage to having a proprietary hardware platform; in fact, it is limiting. The investment required to maintain current versions of proprietary hardware is large and can't keep up with current technology. New video cards and processors are being developed regularly — to keep modifying these hardware platforms to accommodate this is, in our opinion, a waste of time. The advantage to using an open hardware platform is that you can leverage a global technology development environment that continues to develop new and better products that can be incorporated into the media player to keep it current. The proprietary element of a digital signage solution is the software. Proprietary software is almost a requirement. Content delivery and security surrounding it requires proprietary protocols to maintain and keep the content secure.

– David Roscoe, ADFLOW Networks

Using software designed specifically for the operation and management of digital signage networks reduces the amount of customization or daily administration required to run the system. Digital signage software will have built-in capabilities to schedule and deliver advertising and content, deploy tickers and RSS newsfeeds, create and manage playlists and campaigns and provide proof-of-performance reporting. Buying digital signage software from a trusted vendor

with deep market experience means you are getting the best practices and features of previous successful projects baked into the software.

– Robert Ventresca, Netkey

Most flat-panel displays ship with a VGA 15-pin connector so, in theory, you could create digital signage using PowerPoint in kiosk mode. It is best, though, to use specialized software that allows for flexibility in editing content, as well as efficiency in delivery to multiple platforms. What really makes software packages like Scala's InfoChannel stand out is their ability to develop in a PowerPoint-style fashion, but manage with a custom-designed efficiency.

– Chris Wren, The Phelps Group

Proprietary hardware may be useful when distributing content within a digital signage environment. For example, there are proprietary technologies that digitize horizontal and vertical sync signals and filter video signals, enabling high-resolution content to be transmitted faithfully 2,000 feet over Cat 5 cable without signal loss or sync issues. There is other proprietary hardware that allows the combination of DVI, stereo audio and display-addressable RS-232 to be transmitted over fiber and/or Cat 5 cable with no distance limit.

– Randy Young, Magenta Research

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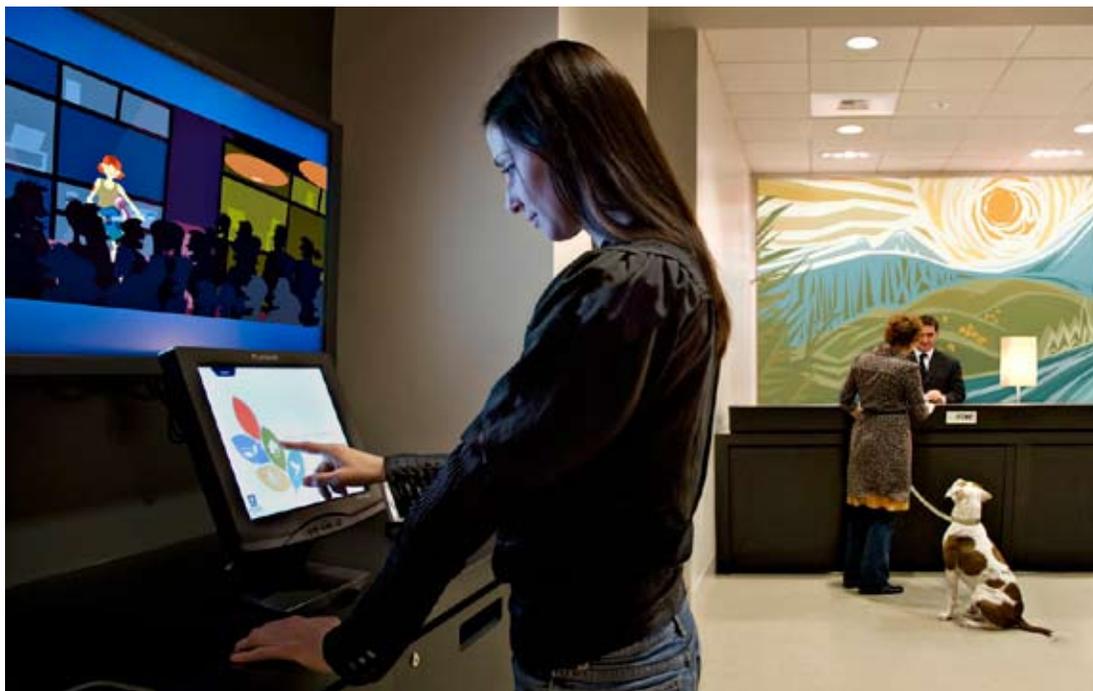
How do I monitor and administer the signage remotely?

A proven solution should have a means to control the player hardware for health and support issues, while providing the tools to monitor, measure and manage the content as needed. The most flexible solutions give Web access from any Internet-connected PC, while others require a proprietary administration terminal for management.

– Brian Ardinger, Nanonation

Some vendors have content-management software with a built-in capability

to monitor all screens, both active and inactive, and also display to the administrator the show that is being displayed on the screen at that moment in time (you can refresh as often as you wish). The content-management software should be able to push a show to any selectable flat-panel screen you want to update information to. Select a vendor with a total IP (networked) solution that can offer you centralized or de-centralized management. You will also want content-management software that can give you reports on what show played on any flat-panel screen, when it played and how long it played. This is not only a requirement for you as an administrator, but it also becomes very important if you



One of digital signage's chief strengths is the ability to monitor, update and change content remotely. This is a paradigm shift from static signage.

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decide to sell advertising time slots (dayparting) to any potential advertisers. This is your receipt that the required shows actually played.

– Bob Brittan, Symon

Centralized digital signage network and content management is the essential to any digital signage network technology. A well-executed digital signage system should support real-time remote player status check, system and content log reporting, remote-control features to poll the detailed player status, screen controls, volume control, reboot player and software upgrades.

– Jimmy Dun, Dynasign

Current enterprise-class digital signage infrastructure platforms offer significant levels of system-monitoring capabilities built in. Combined with industry-standard network monitoring tools, it is relatively easy to set up system-monitoring capabilities that deliver reliability and confidence. Hardware monitoring is typically accomplished through the DS software platform and requires the DS software to “know” which display is being used. The software is configured to communicate with the display to ensure the fan is running and the proper input is selected, etc. The more critical monitoring is the network monitoring and the content delivery and playback reporting. Here is where many DS software products fall down. Work with your DS software vendor to be sure you

understand what their system offers in terms of reporting, alerts and monitoring reporting, and how scalable their monitoring approach is for large networks. If they give you vague answers or try to tell you these things aren’t important, keep looking.

– Brad Gleeson, Planar/CoolSign

Many digital signage software solutions have their own remote-monitoring solutions built into them (Scala, Reflex, Nanonation, CoolSign, etc.). It’s also possible for the player hardware to run a service that provides network monitoring (such as SNMP). The clients can then be monitored by enterprise-level IT tools such as HP Openview, and the monitoring can even be outsourced to third-party service-monitoring companies. Using industrial monitors that can also report that status can give an additional level of reliability. However, be aware that most network-monitoring tools cannot detect some of the common failures that affect digital signage in the field. For example, no software will tell you that a customer has just spilled a milkshake on a screen, or tell you that Adobe Flash license requester or a Windows Security window has popped up in front of your digital signage application.

– Jason Goldberg, MTI

Digital signage players can be managed remotely in two basic ways — either through the content-management software or other software used in the system

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or though a KVM (keyboard, video and mouse) connection over IP. The advantage to back-racking players in a digital signage network and using extension technology to move signals to screens allows for remote management of player and power over IP, regardless of whether the operating system is up and running. Software monitoring, in most cases, requires the player's operating system to be up and running.

– *Dave Haar, Minicom Advanced Systems*

Sophisticated digital signage systems use built-in proprietary software for monitoring operations 24/7. Warning systems commonly include audible or visual alerts on the digital signage control screen, by e-mail and SMS alerts. Typically, monitoring includes visual assurance using streaming technology to verify operation of various channels. Administrators can manage and monitor the system through a Web browser.

– *David Little, Keywest Technology*

Remote monitoring and management is a core function of digital signage software. You should be able to quickly schedule ads or content, deliver that content to the media players and execute specific playlists and campaigns, all from a browser-based administrative portal. In addition, your software package should offer the ability to monitor the status of the media players and screens and provide remote control of those hardware components.

– *Robert Ventresca, Netkey*

Remote monitoring and management is a core function of digital signage software. You should be able to quickly schedule ads or content, deliver that content to the media players and execute specific playlists and campaigns, all from a browser-based administrative portal.

Some video-over-Cat 5 hardware is designed to transmit bi-directional RS-232 signals, even when there are more displays than content streams, or “channels.” This equipment allows individual displays to be controlled and monitored, essential for digital signage metrics. Video-over-Cat 5 is not video-over-IP and is independent of any data network, so there are no potential conflicts or network traffic issues. There are also systems for DVI plus stereo plus bi-directional RS-232 extension over fiber and/or Cat 5 cable, which are used to monitor and administer the signage remotely while extending the digital video and audio signals over long distances.

– *Randy Young, Magenta Research*

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If I choose a digital signage provider who later goes out of business, how easy is it to get someone else to manage the network/system I've come to rely on?

This could potentially be an issue, depending on the stability of the platform and availability and access to the software code-base.

– Brian Ardinger, Nanonation

The best business practice is to partner with a digital signage provider who has years of digital signage experience, a large installed base and can demonstrate profitability, a strong financial backing and a host of satisfied and repeat customers.

– Bob Brittan, Symon

This depends more on the software platform the system is based on than any other factor. If the provider built the system around a stable, well-supported existing platform, you should be able to transition this network to another network operator relatively easily. You can contact the software vendor for their recommendations. If the system was “homegrown” or based on a solution from one of the many new digital signage start-up companies, the transition may be more difficult. Successful DS network operators are reluctant to support another new software platform for

one customer. You may need to transition the network to a more popular and reliable platform, which can be expensive, but will result in a more reliable solution in the long run.

– Brad Gleeson, Planar/CoolSign

If the vendor who goes out of business is the actual software developer, then it can be a significant problem. If the vendor is a VAR (value-added reseller) for a mainstream software tool from a stable company, there is a high likelihood of finding another VAR. If you are working directly with a software provider, consider insisting on a contract where the vendor puts the software source-code in escrow, so that it is available to you in the event that they materially default on their contract. Taking over a software product from a bankrupt developer almost never is very practical, but it can sometimes be a useful last resort.

– Jason Goldberg, MTI

There are many companies dedicated to the task of managing digital signage all over the world and in most major metropolitan areas. My best advice would be to contact the Digital Signage Association for a list of content or network managers. Your breadth of choices may surprise you.

– David Little, Keywest Technology

This depends on the decision you made when you purchased your solution. For

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Selecting a subscription-based model that uses an open hardware platform reduces this risk by providing the most flexibility if something happened to your digital signage provider.

instance, if you selected a proprietary hardware solution, it would be very difficult to install a new digital signage solution onto a proprietary media player. Selecting a subscription-based model that uses an open hardware platform reduces this risk by providing the most flexibility if something happened to your digital signage provider. In this case, you would stop paying your subscription and could have another provider simply load their software on the hardware you purchased and you are back in business.

– David Roscoe, ADFLOW Networks

It's unlikely that any of the major established vendors will go out of business, although they may be acquired. If you select a smaller vendor with little market penetration, you may be able to continue operations for a while but you will be left with an obsolete, unsupported solution. "Caveat emptor" (let the buyer beware).

– Nikk Smith, Pixel Inspiration

This should not be a problem: A system should be operable by you or by third parties. Also, a Web-based system should be available as an enterprise model (run your own) or escrow should

be available. This way, you are assured of continuity.

– Michael Willems,
EnQii/Digital View Media North America

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Can you add touchscreen interactivity to a projection system? How?

The best approach to adding interactivity to projection is to use rear-projection mode where the image is projected from the rear and the interactive element is on the front. We've recently done an installation like this using our Clarity video-wall cubes. We then mounted a custom IR touchscreen system to the front of the cubes. The benefit of this approach is that the user does not block the projected light when using the system.

– Brad Gleeson, Planar/CoolSign

Sure, you can put good optical projection films (such as 3M's) on many pieces of optical glass, and also install a touch-detection technology such as acoustic wave from Elo Touch or resistive or capacitive from MicroTouch (also a 3M company). Alternatively, you can use an image-recognition system like GestureTek in front of the glass.

– Jason Goldberg, MTI

Yes, there are multiple technologies that are either built in or can be added on to projection systems that allow for interactive feedback. More sophisticated digital signage systems should be able to interface to this technology and be programmed to respond accordingly.

– David Little, Keywest Technology

There are ways to add this functionality, but it is not always easy. Depending on the size of area you want to make interactive, there are products that use multiple cameras to determine where you are touching. In some cases, this is an add-on to the projection system; in other cases, you would be required to purchase their interactive system entirely including the projector, media player and camera system.

– David Roscoe, ADFLOW Networks

Yes, this can be done, but there are drawbacks to this. First, to the use of projection systems per se: They are not very bright, viewing angle is limited, and the lights can burn out and they are very expensive to replace. Finally, any touch unit for such a projection device has to be large and custom built, meaning it will be unlikely to be either reliable or cost-effective.

– Michael Willems,
EnQii/Digital View Media North America

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How hackable are networked digital signs?

There is a very low probability of compromise if proper security measures are implemented.

– Brian Ardinger, Nanonation

There is no 100-percent safe solution as long as a computer device is connected to the network or Internet. A digital signage network is no exception. In addition to educating the clients to use the best IT practices in utilizing network security technologies and configuring routers and firewalls, a well-developed digital signage network platform must have built-in security measures to protect the integrity of the contents on both media player and server, as well as during delivery.

– Jimmy Dun, Dynasign

Any digital signage platform you consider should be based upon industry-standard network security standards. Many platforms such as CoolSign utilize an additional level of security to ensure content files have been created and distributed solely within the system. In our case, we use digital encryption that compares a hash attached to the file to an internal database. If the hashes don't match, the file is not played. This type of approach is extremely secure and has been accepted by CoolSign customers such as Bank of America and the U.S. Pentagon.

– Brad Gleeson, Planar/CoolSign

They are like any other enterprise-wide network infrastructure; some are highly secure, others are wide open. Since many digital signs use content types that include scripting (such as HTML or Flash), they can be particularly vulnerable. Very few digital signage software tools have a robust workflow for approving and publishing content (most just use basic access control lists).

– Jason Goldberg, MTI

Your digital signage network can be made extremely secure, especially if you consolidate your players/servers and use Cat 5 distribution technology rather than wireless to distribute signals to screens. You then must use standard networking security to protect your players/servers from outside invasion.

– Dave Haar, Minicom Advanced Systems

Networked signs should use the same precautions as any computer-based system on a network. The advantage of many digital signage systems is that they use proprietary software, making it very difficult to hack as far as compromising the program integrity. Using proper precautions, I would suggest vandalism would be a greater concern.

– David Little, Keywest Technology

Anything that is networked is hackable to some extent or another. Your selection process for the technology should ensure that security is high on the list. The best platforms include content

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validity checks to ensure that data has not been tampered with, but nothing is unbreakable.

– Nikk Smith, *Pixel Inspiration*

If the technology is written well, then the answer is “minimally.” A safe architecture has the digital signs only calling out, and is not a server, so that no incoming connections are ever accepted. There are many more aspects to a secure architecture, too involved to go into here — suffice it to say that a good vendor has addressed all these.

– Michael Willems,
EnQii/Digital View Media North America

Networked signs are fed by computers. They are as hackable as any computer is on the network in question.

– Chris Wren, *The Phelps Group*

A safe architecture has the digital signs only calling out, and is not a server, so that no incoming connections are ever accepted.

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If we use an Internet connection to deliver and manage content, how can we feel secure? What assurances do we have that IP is safe?

IP is the protocol used for the millions of financial transaction currently being processed on the Internet today with insignificant or no issues if proper security measures are implemented.

– Brian Ardinger, Nanonation

Content by nature is typically not confidential or sensitive material, but it can be encrypted. Using a media player instead of a PC also lessens your risk of possible hacking or a security breach. A media player usually does not have a keyboard, mouse, floppy drive or CD-ROM from which outside materials could be introduced.

– Bob Brittan, Symon

The IP connection itself is not the issue. The question is how well your system is designed to address security issues. Use industry-standard enterprise security protocols such as Active Directory to manage permissions along with selectable access levels depending on permission. Additional security measures for when the system is actively connected to the Internet must also be considered. Systems that require a constantly open port to the Internet, such as in an

ASP or SaaS model, require particular scrutiny since security for these systems is especially difficult.

– Brad Gleeson, Planar/CoolSign

Systems that require a constantly open port to the Internet, such as in an ASP or SaaS model, require particular scrutiny since security for these systems is especially difficult.

You can't be certain you're safe; it all depends on how badly someone wants to compromise you. There are well-proven VPN and encryption technologies that can make it very difficult to compromise a digital signage network, but if you can't tolerate any risk, then you will need to use a private WAN.

– Jason Goldberg, MTI

As with any technology where the Internet is involved, you will need to take safeguards using existing security methods to ensure your digital network is secure. Placing your servers/players in a secure environment and allowing limited access through your companies firewall will help to ensure your data is safe.

– Dave Haar, Minicom Advanced Systems

Hardware protection is the Keywest Technology recommendation. For less than \$100 at your favorite electronics outlet, a router can be purchased — those routers can be configured to port

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forward and control which outside IP addresses have access to the device. This hardware protection is by far the most effective and retains all the function and power of the media player — it even allows for remote technical support interaction with the device for the optimum in service. These routers are usually easy enough to configure that a computer-savvy operator can set it up or have their local IT professional take care of the issue. So, the bottom line is that network protection is required, but don't rely on software for security. Use a hardware router whenever possible.

– *David Little, Keywest Technology*

IP is not safe. Hacks exist at every level, but despite this the Internet has become an integral part of all of our lives. You need to be realistic about the threats and guard against them at every level possible. The weak point in any system is typically the passwords you use, not the network.

– *Nikk Smith, Pixel Inspiration*

This is a question for your network administrator. Many levels of security are available — your network is as safe as you have invested in it to be.

– *Chris Wren, The Phelps Group*

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Which architecture has a lower total cost of ownership — player on screen, or distribution over dedicated wire?

Both architectures have their unique advantages, but overall a player on screen will give you the best total cost of ownership with a limitation of a one-to-one relationship (one screen, one show). This scenario is extremely suitable for small- to medium-sized installations. A distributed architecture offers the benefit of one media player supplying content to literally hundreds of flat-panel displays (one show to many screens). This is ideal for large or multisite installations. A distributed network does require additional hardware to propagate the signal out to other displays.

– Bob Brittan, Symon

It varies based on the content display requirements and screen placement. In general, if screen layouts and contents are identical on multiple screens that are located in a close range — say, less than 1,000 feet apart — an AV distribu-

tion system to send a signal to multiple screens from a media player would be a good choice. On the contrary, if each screen is planned to display unique layout and contents, a player on screen will be a better choice.

– Jimmy Dun, Dynasign

The choice of players at screen or centralized distribution should take several issues into consideration. Often, installation and wiring are not cost-effective for particular installations, making a player at the screen the best choice. Other times, the location of the player can be a problem, or an investment in centralized blade servers makes more sense, leading to centralized distribution as the architecture. Managing a large number of remote PCs requires a certain level of administrative and support capability. The good news for customers, I believe, is that they have multiple possible choices and configurations, all of which can be designed to be reliable and cost-effective.

– Brad Gleeson, Planar/CoolSign

It depends on the number of screens that will carry the same content in the

Often, installation and wiring are not cost-effective for particular installations, making a player at the screen the best choice. Other times, the location of the player can be a problem, or an investment in centralized blade servers makes more sense, leading to centralized distribution as the architecture.

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same location. Typically, if you have more than two screens in the same location that will always have the same content, it will be more effective to use some form of one-to-many video distribution in your signage network.

– Jason Goldberg, MTI

Our experience shows that using distribution over an out-of-band Category 5 network is significantly less expensive to maintain and install. There are also quality-of-performance and aesthetic issues that are better using distribution systems. As an example, in certain environments access is limited to off hours because screens are located in customer traffic areas — using a distributed system allows for access to players at any time of day, regardless if the store is open or not. Also, when sending the same content to multiple screens (check-out areas, menu boards), distributed technology is typically less expensive because you can use less players and pay lower licensing fees (depending on your software). In this environment, you also don't need to deal with sync issues and clock speeds — your message is getting to each screen at exactly the same time.

– Dave Haar, Minicom Advanced Systems

Dedicated players for each screen will cost anywhere from \$600 to \$2,000, depending on how robust the hardware/software needs to be. They offer the most in flexibility because individualized

content can be displayed at each location. On the other hand, Cat 5 or fiber-distribution technology may cost somewhere from \$300 to 600 per screen, but gives you the same image on each screen. With no doubt, using distribution technology lowers the cost of images per screen.

– David Little, Keywest Technology

Initial cost of installation for a “player on screen” solution would be more cost-effective in the short run, but if there are any maintenance or service issues the additional cost of having to remove the media player from the screen before servicing adds a lot to the costs of service. It has been our practice (and we have installations in both scenarios) to locate the media player away from the screen and run a VGA cable directly to the screen. This way, the media player is easily accessible for service and reduces the overall cost of maintenance.

– David Roscoe, ADFLOW Networks

Distribution is much more cost-effective and allows a much more powerful player device to play the content. Screen-mounted players offer great localization, but are currently compromised by their lack of raw graphics and processing power.

– Nikk Smith, Pixel Inspiration

Typically, player on screen. This also provides better affidavits and individualized screen control. But each case is

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different, and a good vendor will work out the best case for your network.

– Michael Willems,
EnQii/Digital View Media North America

In a linked configuration, playback over Cat 5e (or other) can be very economical. Aside from some hardware for distribution, you can save on the need for dedicating a computer processor for each screen.

– Chris Wren, *The Phelps Group*

Distribution over cabling often has lower long-term cost of ownership due to reduced maintenance costs. High-reliability video-over-Cat 5 receivers have no moving parts or software and are, therefore, inherently much more reliable than players. They are designed to withstand heat, cold, humidity, dust, vibration and electrical noise, and have been successfully installed in harsh environments for many years. The initial capital cost for Cat 5 receivers can be lower or higher than players, depending on the distance from the source(s) to the displays.

– Randy Young, *Magenta Research*

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Is there hardware available that eliminates the need for a PC?

Yes, the device is known as a media player (look for a vendor that can supply you a turnkey solution including the media player). At a minimum, the player should include a video interface for multimedia broadcast distribution supporting MPEG 1/2/4, VGA and DVI video output and MP3 audio. It should support LiveTV and streaming video, cinematic transitions and multiple-screen area layouts including scrolling ticker and real-time information. The media player should be designed to facilitate different types of mounting with security in mind, making installation easy and potential tampering difficult. It should also have a small footprint and low-profile case design compared to a PC, and have the option to be located adjacent to the LCD or plasma, or inconspicuously nearby in a closet, kiosk or other mounting structure.

– Bob Brittan, Symon

Thin client or set-top-box-type player appliances are offered by selected providers in the digital signage marketplace. The benefits of these devices are that they can be less expensive initially than a full PC, smaller size, lower power requirements and overall system simplicity. The trade-off is that these devices are typically not designed

to perform multizone, high-resolution, dynamic content rendering at video frame rates. Therefore, content design and overall video performance is usually compromised and the system is much less flexible and sometimes can be less secure. For very simple systems where cost is the issue and content quality is not critical, these can be a viable option. These systems are still relatively new to the DS industry, however, and so customers should do their homework on the vendor and the proven reliability and performance of the products.

– Brad Gleeson, Planar/CoolSign

There is hardware that eliminates a PC and its OS. Such hardware is dedicated to the task of only one function: playing back digital media. The disadvantage of such dedicated hardware is usually found in limited operational functions of a digital signage system, which may include limited screen segmentation and sizing options, limited media support, limited content aggregation from external sources, limited playback features, limited interface for interactive features, limited storage capacity for media and limited ability for remote administration and management.

– David Little, Keywest Technology

Yes, but this typically restricts the type of content and the content strategy you can employ.

– Nikk Smith, Pixel Inspiration

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A self-managed PC means a lot of maintenance and support work. A dedicated “appliance,” whether PC-based or other hardware-based, essentially means that you do not need to worry about this. A PC needs you to be responsible for maintenance, settings, upgrades, rebooting and so on; a dedicated “appliance,” even if, in fact, PC-based, means that the vendor is responsible for end-to-end functionality. Further, the vendor will have built in special software to monitor the player’s performance and to guarantee its functionality.

– Michael Willems,
EnQii/Digital View Media North America

It depends on what signal you are trying to send. Some companies, like Panasonic, actually make a computer that fits inside of the plasma so you still have a PC, but you don’t have that extra piece of equipment.

– Chris Wren, *The Phelps Group*

It’s helpful to minimize the number of PCs involved, since they’re more costly to maintain in the form of software licenses, updates, IP addresses and occasional failures. You can imagine the problems with PC maintenance out on the floor of a digital signage environment, sometimes in front of customers. It’s advantageous to have a zero-maintenance device such as a high-reliability Cat 5 receiver at each display, rather than a PC. Signal distribution over Cat 5 cable minimizes the number of PCs to

It’s helpful to minimize the number of PCs involved, since they’re more costly to maintain in the form of software licenses, updates, IP addresses and occasional failures.

one per channel (or fewer with multiple-output graphics cards), rather than one per display. Plus, the PC(s) can be more easily maintained in a controlled, secure environment.

– Randy Young, *Magenta Research*

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How do I choose between digital signage players and standard PCs?

Digital signage players (media) are specifically designed to operate flat-panel screens. They have no external access — making them secure devices — and use optimized operating systems, video graphics cards, memory and other software that is intended for displaying high-quality video and audio. Media players are plug-and-play and forget boxes and are IT friendly. There is the possibility that an off-the-shelf PC can be hacked and they are not typically populated with satisfactory components for the highest-quality video. Additional software is required to make it a digital player device. IT departments are not keen on adding additional servers or PCs to their networks.

– Bob Brittan, Symon

I don't believe this choice should drive either the selection of the software platform or the design of the system. Players are simply end-points to the network. Earlier questions should be about the goals of the network, the content strategy and the installation and support strategy. These answers will inform the choice of software infrastructure, which will then lead to the requirements for this network. Some software companies deliver their solution on signage player appliances to improve the customer

experience. Others run just as well on industry-standard commodity PCs. Either approach works well and overall system cost will probably not hinge on this choice. In some cases, corporate/enterprise customers will require a standard PC to ensure their ability to manage and maintain these systems and the network.

– Brad Gleeson, Planar/CoolSign

Dedicated players are usually single sourced, so you're at risk if your vendor changes their model, goes out of business or wants to raise their prices. You're also locked into a single software solution with your dedicated player. PC-based players are more flexible and have a higher residual value if you need to change software providers in the future. But they can be more complicated, expensive and more difficult to make reliable.

– Jason Goldberg, MTI

In some cases, this will depend on the content-management software you choose to use in your installation. Some software comes embedded in specifically designed players. Other software can run on standard PCs, providing they meet the performance requirements of the software. Dedicated players tend to be a little more expensive than standard PCs, but they also can be relied on to perform up to the software company's capabilities.

– Dave Haar, Minicom Advanced Systems

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I believe the best answer to this question is to work with your digital signage software partner. First, find the software that meets your needs. Then, your software provider can help you determine — based on the functions required, number of locations, etc. — what hardware would best express the software's capabilities.

— David Little, *Keywest Technology*

PC allows you the most flexibility — whether it's mounted inside the plasma or just connected to the plasma. Remote-management solutions usually require a unique IP address for each sign

Let your content strategy decide what the network needs to deliver.

(keep in mind you can use one computer to serve several displays as long as they are displaying the same thing).

— Chris Wren, *The Phelps Group*

Let your content strategy decide what the network needs to deliver and then select the hardware that provides the functionality required at the lowest TCO (total cost of ownership).

— Nikk Smith, *Pixel Inspiration*

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How do I choose between Windows, Mac and Linux?

Each operating system has advantages, benefits and challenges. Oftentimes, it comes down to a company's familiarity to support a particular platform. One size rarely fits all IT needs and situations; that's why Nanonation has chosen to support multiple operating environments.

– Brian Ardinger, Nanonation

Typically, it's a customer preference, but there are more high-end video and audio digital solutions using off-the-shelf Windows components manufactured by the leading digital signage vendors.

– Bob Brittan, Symon

Mac is rarely used as the OS on media players. A Linux-based player costs less but faces challenges of fewer available support resources and limited and/or lagging content format support in comparison to Windows.

– Jimmy Dun, Dynasign

These are elements to be considered, but don't typically drive the solution. The exception is corporate/enterprise networks that demand compliance to corporate standards, usually Windows. But this is less and less often a hard requirement.

– Brad Gleeson, Planar/CoolSign

The first question is, will your IT department be managing the players as individual nodes on their network and providing service and support?

The first question is, will your IT department be managing the players as individual nodes on their network and providing service and support? If so, it's best to choose a solution based on their preferred OS. In fact, it's best to build a solution starting with their standard OS image. If the network is going to be managed and serviced by a third party or by the digital signage VAR and merely treated as a "black box" by your IT department, then the OS really doesn't matter. Choose the best software tool and VAR for your needs, and use whichever OS their solution is based around.

– Jason Goldberg, MTI

In almost every case, Windows-based systems will have more robust features and flexibility. If your digital signage screens are mainly just looping media files with minor adjustments, the other platforms may perform satisfactorily.

– David Little, Keywest Technology

You need to decide if it is important to your digital signage network to be able to be file agnostic when it comes to the media files. Mac and Linux both have challenges with keeping up to date with

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the latest media file playback. Windows, on the other hand, has the most flexibility when it comes to playing the latest in media files. With the latest HD formats, Windows has the least limitations with file compatibility.

– *David Roscoe, ADFLOW Networks*

All three are fine. That said, most reliable architecture is Linux-based — not because of the lack of licensing costs, although that helps — but mainly because of control (the vendor can make the box do “anything”) and reliability (a typical Linux-based player or server can be up and running without any issues or reboots for many years).

– *Michael Willems,
EnQii/Digital View Media North America*

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What display technologies exist aside from LCD, plasma and LED?

The main ones not mentioned here are rear-projection and projection screens. Rear-projection screens offer the most screen for the money, but they are not as thin as flat panels and have been much more repair prone. They also do not have the sleek appearance that makes LCDs and plasmas so appealing in the retail environment. Projection screens definitely have their place in certain display areas. They will require a suitable surface in order to be visible and will certainly make an impact if used in the right application. You can display a very large image and not lose clarity with today's projection technology. Projection bulbs have a longer life than previous generations, but are still expensive to replace.

– Bob Brittan, Symon

Variations on these technologies will begin to become available this decade with OLED (organic LED) and E-ink (electronic ink) being particularly interesting for shelf-edge displays. For large-format displays, other options include rear-projection video-wall cubes, which continue to be very desirable where a large indoor image is required. They are very cost-effective and reliable, and lamp lives are extending longer than

in past years. Front projection also has its use in digital signage and is a very complementary technology for large image signage where lighting can be controlled.

– Brad Gleeson, Planar/CoolSign

You name it ... it's a veritable alphabet soup: OLED, DLP (digital light processing), LcoS/D-ILA/SXRD, SED (surface-conduction electron-emitter display) and CRT (cathode ray tube). E-ink is also a very interesting technology for certain applications (as seen in the Amazon Kindle and Sony Reader).

– Jason Goldberg, MTI

We will soon see the first of a new breed of promising display technologies that may eventually provide lower cost, greater contrast and thinner substrate. Such technologies include carbon nanotube and organic LED TV displays, along with smaller applications using e-paper. Of course, only time will tell if they are worthy of replacing entrenched technologies.

– David Little, Keywest Technology

There are new technologies that will soon be available such as Laser TV, which in theory will be more cost-effective to produce than LCD and plasma and provide better image quality and reliability.

– David Roscoe, ADFLOW Networks

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What's the next technology on the horizon for digital signage?

The biggest challenge for digital signage remains making it as easy to deploy as a networked printer and being able to objectively measure and monitor its effectiveness wherever it is deployed. There are a lot of very smart people working hard to close the gaps that remain in these areas. Enterprise-class software platforms, reliable integrated displays as network endpoints and stand-alone digital signs are all becoming available now. Real-time measurement either in software analytics or in camera- or sensor-based monitoring are both becoming available and will drive CPM and adoption in advertising models. I believe the biggest gains of the next 10 years will not be so much new technology as execution of existing technology to drive industry standards and long-term adoption.

– Brad Gleeson, Planar/CoolSign

Context-sensitive digital signage. Passive digital signage really feels like an

I believe the biggest gains of the next 10 years will not be so much new technology as execution of existing technology to drive industry standards and long-term adoption.

intermediate step in evolution of in-store communications. Once you have a display technology that can change from customer to customer, the next logical evolution is to know more about the customer and what they are doing in the store to tailor the communications in real time. This will involve a variety of sensors in a retail environment as well as RFID tags on products and even customers.

– Jason Goldberg, MTI

Broadening the uses of digital signage by giving the sign some level of intelligence will become the next milestone. These interactive signs of the future will use either pre-programmed or artificial intelligence to improve customer experience and service.

– David Little, Keywest Technology

Think of when and where you can affect the customer experience. That is where digital signage is going. From in-store music to interactive kiosks to coupons on your cell phone — the ability to control all aspects of the customer experience will provide the ability to synchronize that experience to maximize the impact of the digital signage campaign.

– David Roscoe, ADFLOW Networks

There is increasing interest in enabling interactivity with large-format screens, in essence combining the best of digital signage with self-service kiosks. For certain applications — menu boards in a

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restaurant, for example — interactivity gives the consumer an easy way to drill through the menu selection to find information about a particular item. Using software that is optimized to support both content delivery and touchscreen enablement is key to successful interactive signage deployments.

– Robert Ventresca, *Netkey*

The future is not only about interaction, it's also about immersing the user onscreen. The video camera is proving to be very versatile as an interactive interface for digital signage. It not only adapts to different sizes and shapes of signs and engages users' basic motions, it also allows for point and control of multimedia. Video cameras can also provide metrics on foot traffic, the number of viewers looking at the screen and viewing duration.

– Vincent John Vincent, *GestureTek Inc.*

Early next year, video-over-Cat 5 technology will enable WUXGA resolution (1920 by 1200) video, stereo audio and bi-directional control signals to be extended 2,000 feet from the source. This enables nearly PC-less digital signage at very large venues, independent of IP networks while reducing capital costs. Toward the middle of the year, large-scale Cat 5 full-matrix switchers will be available with bi-directional serial control and monitoring.

– Randy Young, *Magenta Research*

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When can we expect to see e-paper as a practical, cost-effective solution?

This technology is available today, but has not been adopted because it is limited in resolution, color and frame rates. But it is being used and can be cost-effective if deployed appropriately. It is ideal as a shelf-mounted pricing and promotional display. Larger applications are also viable. But it will be limited to being a minor complementary display technology until it is either higher performance (color and video) or very, very inexpensive.

– Brad Gleeson, Planar/CoolSign

Very soon. We now have a variety of high-volume consumer devices using the technology that will drive its price down. Color and better yield for large sizes are just around the corner. Two very appealing elements are its very high contrast (even more important given the vision of our aging population) and its very low power consumption (in a climate where we are focused on sustainability).

– Jason Goldberg, MTI

I think this is years in the future to be a mainstream practical solution. There are cost and acceptance issues that have not been resolved yet but are in the works.

– David Roscoe, ADFLOW Networks

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Content

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How often should we update our content?

There is no magic-bullet answer since the answer will depend on a variety of factors ranging from type of venue, customer demographics, desired business objectives and other factors that affect costs and timing of content. A general rule is that content should be refreshed as often as to continue to grab attention and drive customer action.

– Brian Ardinger, Nanonation

Without good content, you don't have a viable product. Update content often enough to keep it relevant, interesting and exciting. Like anything else, viewers will stop looking at your screens if they already know what to expect. Frequency of updates should be judged by how appropriate the technology is to the retail format and customers' expectations.

– Bob Brittan, Symon

Content is what makes or breaks any digital signage network initiative. Always keep the screen content fresh, interesting, entertaining, relevant and informative. A well-executed digital signage technology must have features to facilitate quick content publishing based on simple image and text overlay with light animation as well as the support for live XML/RSS feeds, even real-time database access.

– Jimmy Dun, Dynasign

Often enough to drive viewing, but not so much that it breaks the bank. What are the objectives of your system? What is it replacing? How closely are you tying content to other marketing and promotions and how often do these change? Do you have an advertising business model where ads are sold in units of time and frequency? Is dayparting a reality in your business? All these things and many more should go into the content strategy.

– Brad Gleeson, Planar/CoolSign

That depends entirely on the frequency of your shopper visits and the frequency of SKU changes in your category. If your shopper visits weekly, then you'll want weekly updates to keep the messaging fresh. If you shopper only visits once a year, but you have four major product refreshes a year, then you'll want quarterly updates.

– Jason Goldberg, MTI

Update frequency of content depends greatly on frequency in which audiences repeat their visits. In locations where audiences may be visiting very frequently, the content will start to feel stagnant after a few exposures, necessitating a more frequent update cycle.

– Rocky Gunderson, SeeSaw Networks

The beautiful thing about digital signage is that you can update it as often as you need to without expensive printing or production costs. Updates don't neces-

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sarily mean you need to re-render the entire playlist. It may mean just changing a price or acknowledging a different employee of the month. Smarter digital signage systems automatically update most, if not all, content, which is sourced from databases and/or other content partners.

– David Little, Keywest Technology

The beautiful thing about digital signage is that you can update it as often as you need to without expensive printing or production costs.

As often as possible. If the same commuter sees the same loop of ads in the subway every morning for a week, after day two their attention is lost and the \$2,000 LCD screen might as well be a print ad. By interspersing daily informational content such as date, time, weather and news with advertisements in a reliable show schedule (every 10 minutes), viewers will look for that as their daily morning or evening source of information, thus building loyalty to your display.

– Mike Welsh, AccuWeather.com

You should only update when you have something of value to say. Most people feel they have very little “free time,” so don’t waste it with redundant messages.

Give them a reason to give you three to eight seconds of their time — even if they are a captive audience in a check-out line.

– Chris Wren, The Phelps Group

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How do you determine duration, repetition and other attributes of content?

In-store digital signage is a “glance media.” Messages should be short, sweet and to the point. Thirty-second TV spots will generally not be effective. Businesses need to take into account the customer’s expectations, goals and desired outcome when creating content to meet these objectives and driving business goals.

– Brian Ardinger, Nanonation

Know your audience. Are they passing by quickly or waiting in a queue? If viewers are transient, like in a mall walkway or a sports arena, the same messages can be recycled in a relatively short time period and will still be fresh for the next viewer who walks by. Actually, three to five seconds is all they will probably see unless you have content that will stop them in their tracks. For viewers who may linger in a certain area or POS, visual dynamics change dramatically. The actual length will depend on what your goals are: product sale, information, entertainment, POS impulse buy, etc. Digital signage has been proven to reduce perceived wait times for those in a line.

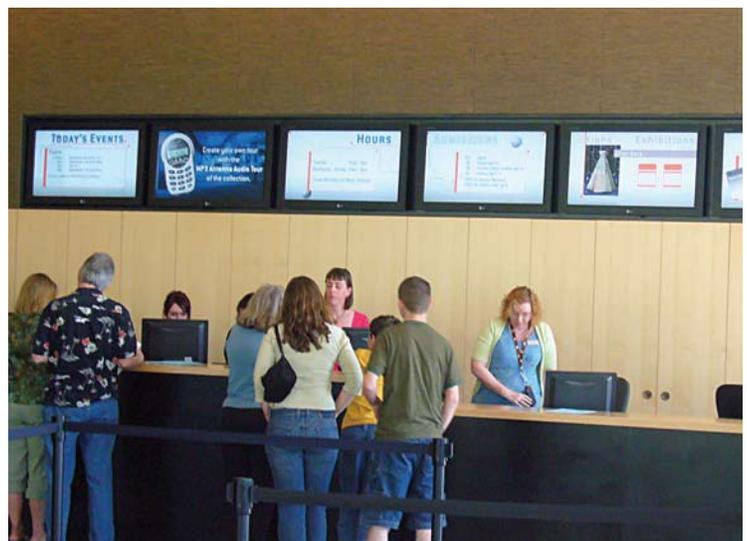
– Bob Brittan, Symon

This is dependent on the nature of your business and the way people behave in

your stores. Typically, a “call to action” message shouldn’t last more than seven seconds and the message must be very clear. The loop duration depends on the display location. If your digital signage is located in retail aisles, it should be longer than one minute (e.g., seven to eight different messages in a loop). If the display is located in waiting areas, the content can be longer.

– Chaim Fleischer, RePromotion

Many digital signs have too long a duration and are not repetitive enough. A recent POPAI study on shopper engagement found that a shopper walks by five pieces of POP every three seconds they are in the store, and that they passively read one piece every three seconds. That means that at most your sign has three seconds to catch a viewer’s atten-



Digital signage has been proven to reduce perceived wait times for those in a line.

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tion and make a compelling value proposition. If you can't win the customer's attention in the first three seconds, then the rest of your content won't matter. If you have three compelling seconds of content, do you want that content on screen for every customer or just once every five minutes?

– Jason Goldberg, MTI

There are a lot of considerations in determining the attributes of a particular content strategy. These include the average dwell time of the audience and the “captivity” of the venue. Highly captive locations allow for longer spot lengths and loop lengths may be designed around the average wait time, ensuring that most of the loop will be exposed to any one viewer. On the other hand, short dwell time or transient locations require shorter spots designed to capture the attention extremely quickly. There is no easy, generalized answer to this.

– Rocky Gunderson, SeeSaw Networks

The timing of the message and how often it can be repeated completely depends on where you are playing the message and how long a particular person will be in front of your screen. The answer to this question also is determined by what your digital sign is being used for. The timing will be very different moving from a retail location, to a doctor's office, to a menu board, to a directional sign, to a checkout line, to an outdoor billboard, to a classroom, to an airport gate, etc.

Viewing audience patterns must be understood and taken advantage of with targeted messaging.

– Dave Haar, Minicom Advanced Systems

Viewing audience patterns must be understood and taken advantage of with targeted messaging. For example, if you are a medical clinic with a display in the waiting room and know your audience sits for an average of 20 minutes, then your content duration is 20 minutes. Repetition is based on achieving a specific viewer behavior and, once measured for effectiveness, determines frequency. For example, if the desired goal is to promote a specific service that would reduce clinic wait time by going to a Web site and pre-booking an appointment, run the message enough times during that 20-minute dwell time to get the number of pre-booked appointments required and adjust the frequency of that message to optimize the desired result. Sometimes you only have to play a targeted message once, and other times it needs to be every three minutes in a 20-minute play loop. The key is to measure the impact and react accordingly — don't guess.

– Wayne Ruttle, ADFLOW Networks

For informational content, each relevant piece should be shown during each dwell time. If it's known that the average

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fueling experience is 4.5 minutes, the relevant information should be shown once during that dwell time. If there are 100,000 passers-by in a NYC subway turnstile and it takes 10 seconds for them to get through line and swipe their Metrocard, this information should be included at all times in a sidebar or L-Frame. Give your audience the info they need as they need it, and you will retain and build viewership.

– Mike Welsh, *AccuWeather.com*

Really, it's whatever best communicates your message, as you see in TV commercials for the TiVo generation. Give your signage the "passing eye" test. Or, read a magazine article while watching your signage. Put yourself in the customers' place. If you're a department store with signage in a window, entice passers-by with beautiful still images or high-definition motion video about what's inside the store. If you have signage at your POS, plant ideas about their next visit to your store.

– Chris Wren, *The Phelps Group*

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Should I have my own production and design team, or should I hire an external company?

It is best to engage experienced professionals in the beginning, even if you feel you have in-house resources, to ensure efficient adoption of digital media, as there is a learning curve and experience will reduce that time to effective marketing and business goal achievement. Once the learnings have been established and results measured and achieved, taking on the production and ongoing management of a successful digital signage initiative is very doable and recommended. Control of this in-house is optimum if you have the resources and expertise.

– Wayne Ruttle, ADFLOW Networks

Depends on their expertise in developing media and user interfaces for public-space venues. Developing for these “self-service” environments is significantly different than developing content for Web sites, television or other media.

– Brian Ardinger, Nanonation

Good question. This depends primarily on your goals, resources and talent. If you are a small company with no design expertise, look for a digital signage vendor who can either do the work for you or at least help you get started. Many large companies already have the re-

If you are a small company with no design expertise, look for a digital signage vendor who can either do the work for you or at least help you get started.

sources to create an entire production and all they require is training on the content-management software. Also, look for a vendor who can supplement your content with other information like ticker or live TV news and local weather to keep your content interesting and informative.

– Bob Brittan, Symon

It will be hard to generalize the recommendations for in-house or outsourced content production. It will depend on the size of the operation and nature of its own business. But if outsourcing is the direction, make sure to use a local content producer to shorten the cycle of communications in designing and fine-tuning of the content. A quick face-time at a local coffee shop will get a lot done in knowing your contractor and conveying your ideas and goals the content.

– Jimmy Dun, Dynasign

If your budget allows it, it is best to have an in-house employee to work in tandem with your marketing and communication departments.

– Chaim Fleischer, RePromotion

People coming into digital signage can come from many directions — AV, tele-

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com, systems integration, advertising, etc. Often, companies with strong core competencies in one of these areas try to increase profits by convincing customers that they can provide all the services they need — a one-stop shop. However, content creation and advertising sales are both quite specialized and, frankly, quite readily available to network operators who have an attractive network footprint. For larger branded networks, the end-user often wants the network operator to work with their agency of record for content. This content often needs to be “repurposed” — changes in format, duration, etc. This is fairly straightforward and can be managed by reasonably experienced creative people. Creating unique digital signage content, for all but the most straightforward content types, is best left to experienced creative agencies, in my opinion.

– Brad Gleeson, Planar/CoolSign

It can make a lot of sense to prove the value of digital signage network by hiring a firm with experience in both visual merchandising and digital signage. In the long run, if digital signage is a going to be a core tool for your enterprise, then it makes sense to begin developing your own core competency over time.

– Jason Goldberg, MTI

If your production team has experience in television production, Web design, animation and multimedia, then they possess the skills needed to be successful

with digital signage content. If they lack one of these competencies, then your communication strategy will get closer to the target by outsourcing the content to a firm that understands the dynamics of digital signage and has the ability and experience to leverage it.

– David Little, Keywest Technology

This depends. If your company has an internal graphics department — use it. Keep your message consistent — just because it’s digital doesn’t mean it has to be wildly different. But also, don’t be afraid to enlist experts. It’s likely your internal group will have ideas that may be better executed by an external company. Again, it is helpful to think of digital signage like TV: You may create the idea in house, but use someone more experienced to actually produce it.

– Chris Wren, The Phelps Group

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How do I normalize audio levels so that they sound correct in different environments?

The content-management software should have the capability to set audio levels. Also, check with your vendor and make sure they have a product component that can automatically check the audio levels on all of the active screens in your network. This auto volume module should be able to turn the set on and off, adjust volumes to preset levels and make sure the set is tuned to the correct channel. This software should be able to monitor and make corrections at user-defined intervals.

– Bob Brittan, Symon

In most cases, you don't use audio at all. It usually annoys customers, and over time, it may even bother your own personnel.

– Chaim Fleischer, RePromotion

Audio leveling within the signage platform software is generally available. The best products will allow for auto-leveling and

remote adjustment on a track-by-track basis. If sound is required for your digital signage implementation, don't forget to look into other audio systems that may impact the performance of the signage content. This seems pretty obvious, but it's surprising how often the signage and overhead music are supplied by different vendors who either don't know or don't care what else is going on at each location. This can be an opportunity for the signage provider to add audio services to ensure audio and signage content are synched. Be sure you understand audio licensing requirements first.

– Brad Gleeson, Planar/CoolSign

The best practice is to use active sound pressure level monitoring to dynamically adjust audio levels on the fly. This is because the acoustics in the store will change depending on how many customers are in the area and what activities are occurring around the department.

– Jason Goldberg, MTI

Using specially designed speakers to "channel" sound will go a long way in avoiding annoying audio dispersion in different environments. Additionally, so-

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phisticated digital signage systems can detect the presence of people and ramp sound up and down accordingly. Using both of these approaches together can provide astonishing results in the most difficult of environments.

– *David Little, Keywest Technology*

Any good digital signage system has built in technology and functionality to normalize audio levels based on different environments, so when engaging solution providers ensure they have this expertise and capabilities inherent in their offering. Audio can be an extremely effective messaging tool if delivered effectively and, conversely, a disaster if not handled correctly. Again, nothing replaces experience and expertise.

– *Wayne Ruttle, ADFLOW Networks*

Technically, you can't. You can master your audio tightly (peaks at 0, average at -2dB) but if the volume setting on the actual speaker isn't correct, no amount of mixing work you do will fix that.

– *Chris Wren, The Phelps Group*

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How can you link signage content with POS information?

This can be accomplished in two ways: manual process and automated process. If your POS system has the capability to integrate (communicate) to a digital signage system and if the digital signage system has the ability to do the same, integration is possible and recommended. The key to success with POS integration is the strategy around ensuring the business objectives are understood, the data is available on the POS system and the content is aligned to evoke the desired outcome. For example, if you are a retailer and specific product inventory is high or low in each store, content can be automatically triggered to reflect this inventory situation through POS integration or it can be done manually if the digital signage system has the ability for local intervention.

– Wayne Ruttle, ADFLOW Networks

If POS information is available through an application programming interface (API), integration with POS data to link that data to digital sign data is a straightforward development process.

– Brian Ardinger, Nanonation

In general, there two ways to utilize the POS systems to display the digital signage contents on POS. One way is to display the digital signage content loop while the POS is idling. The other method is to allocate part of the POS screen to display the product information, promotions and messaging that are relevant or related to the products and/or its retail business. The digital signage and self-service industry are on the convergent path. We have recently developed a feature for a kiosk vendor to market a product that the digital signage screen can transform to kiosk mode if the screen is touched or triggered by a sensor when someone is standing close to the screen.

– Jimmy Dun, Dynasign

It turns out that this is less of a technical issue than a cultural and practical one. Leading enterprise signage software platforms allow dynamic content to be created that is updated from external databases and data systems. However, POS systems are considered critical infrastructure in retail environments and end-users (and their IT/retail ops people) are extremely reluctant to give “outsiders” access to these systems and data sources. Third-party middleware providers like DS-IQ have been suc-

If you are a retailer and specific product inventory is high or low in each store, content can be automatically triggered to reflect this inventory situation through POS integration.

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successful at doing this, and it has been accomplished through the large-scale systems integrators like IBM and Accenture. The reality is, most retailers are not sophisticated enough yet or don't trust their own systems and personnel enough to extend this far with their signage networks. It will happen eventually, and when it does, the digital signage technology is ready for it.

– Brad Gleeson, Planar/CoolSign

Measuring sales in control stores vs. test stores (with digital signage deployed) is a common match panel test methodology that can determine the effect digital signage has on sales velocity. DS-IQ is a firm that is actively developing software tools to correlate POS data and digital signage playlists.

– Jason Goldberg, MTI

Many sophisticated digital signage systems will output data based on when and where advertising occurred. This data can be synchronized and analyzed with POS information to see what correlations exist between advertising and sales. Adjustments to advertising can be compared with POS performance, and eventually patterns will emerge that may suggest “best practice” under certain conditions.

– David Little, Keywest Technology

Point of sale information can be linked to digital signage by providing the shopper with an amenity: information they will

Enterprise digital signage can link across multiple venues, and can interface with multiple sources of business intelligence – including the point of sale.

Department stores	Warehouse clubs
Mass merchandisers	Consumer electronics
Restaurants	Drug stores
Office supply stores	Professional services
Grocery stores	Specialty retailers
Music and video stores	Banks

need to know as they leave the store, and a reason to return. Relevant informational content such as weather on the way out — “Currently 32 degrees with freezing rain” — helps remind the customers that the roads may be icy, perhaps including “brought to you by <<tire sponsor or local tire store>>.” The customer appreciates this reminder and associates that appreciation with the store that provided it. Network ads can also be sold at POS as customers leave the store: “Remember, it's Wednesday night and “Private Practice” airs at 9 Eastern time on ABC.” Finally, give the customers a reason to return to the store — “see our weekend deli special starting this Thursday afternoon.”

– Mike Welsh, AccuWeather.com

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What are the pros and cons of wireless vs. wired content delivery?

At this point in time, wireless connectivity is not a perfect science and, therefore, hard-wired content delivery is always recommended as a first choice. However, not all venues have this luxury, so typically you have a combination of wireless and wired locations with wired being the preferred approach. It is not so much the concern to get content delivery distributed to display screens on the first communications attempt, but more about the DS system requirement to actively monitor the health of the displays to ensure they are up and running and that content is always playing, and for this you need a sound connection to the displays.

– Wayne Ruttle, ADFLOW Networks

Wireless — low cost of installation and implementation but low bandwidth and possible interference from other external power sources. Line of sight/difficulty in penetrating walls and floors, especially with the 802.11a wireless standard; unreliability with distances beyond 100 feet (30.5 meters). Resolution limitation (640 by 480) due to available bandwidth (average actual throughput is 27 Mbps or less, depending on the wireless standard). Even though the specifications might say it's compatible with 1280 by 1024, wireless typically down-converts

to 640 by 480. Multiple-content distribution limitation due also to bandwidth and content: not truly compatible (i.e., glitch-free) with full-motion video. Wired — more expensive but more reliable and capable of very high bandwidth, which is required for large video files. World-class video image presentation quality, complete format agility — no limitations and compatibility with vendor switching and distribution equipment from any number of sources to any number of displays. It has accurate sync signal reproduction, electrical and mechanical ruggedness, resistance to sources of electrical interference, plug-and-play ease of installation and a “married” resolution, frame rate and distance specifications — no “up to Specsman-ship.”

– Bob Brittan, Symon

Use wired wherever possible. Although wired connections cost more in deployment in most cases, it will save money on troubleshooting and support for years to come. On the other hand, wireless content plays a huge role in digital signage for outdoor application. Many of our media network customers are moving to 3G mobile wireless content distributions to the outdoor signs and locations that do not have the full cooperation of local management in providing a stable network connectivity.

– Jimmy Dun, Dynasign

Wireless technology is a great option when wired infrastructure is not avail-

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As wireless becomes ubiquitous, gaps in capability and cost will diminish. Until then, wired is recommended as a first choice, but in most cases wireless can work just as well.

able or impractical (such as in transit vehicles). Otherwise, wired will always provide a higher level of potential reliability, security and bandwidth. As wireless becomes ubiquitous, these gaps in capability and cost will diminish. Until then, wired is recommended as a first choice, but in most cases wireless can work just as well.

– Brad Gleeson, Planar/CoolSign

There are both wireless LANs (for delivery content throughout a single store) and wireless WANs (for delivering content throughout a network of stores). Wireless WANs are usually satellite based so they are expensive to set up, but can move a large amount of data in one direction (for the NOC to the store). Cellular wireless WANs are becoming more popular, but fixed wireless WANs simply won't work in some percentage of your stores, and it's impossible to predict until after you have deployed. So you need to conduct an expensive site survey of each location before doing a deployment. Wireless LANs can be fast and cheap to install compared to wired LANs, but they are less reliable. Retailers are using wireless technology more and more often for inventory management and POS solutions, so the wireless

space can be very crowded in a retail store.

– Jason Goldberg, MTI

Wireless is generally quicker to deploy and enables screens to be moved far more easily. However, wireless can suffer from interference and bandwidth limitation issues more than wired. These issues are more pronounced when streaming content and less of a problem in a store and forward solution. Security has been a longstanding issue with wireless and the risk of third-party interference has been a problem for the last two or three years. However, with the recent emergence of more robust wireless security protocols, this problem has largely been overcome.

– John Griffiths,
EnQii/Digital View Media North America

The overall reliability of wireless is still less than wired, and wired still can produce the best bandwidth for data delivery. However, wiring may be an insurmountable problem for some installations, and, if this is the case, wireless offers a cost-effective alternative.

– David Little, Keywest Technology

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How can you make sure your content is being displayed? Can this be checked remotely, or do you still need to periodically drive around and double-check?

Some vendors offer content-management software with a built-in capability to monitor all screens, both active and inactive, and also display to the administrator the show that is being displayed on the screen at that moment in time. Vendors such as Symon also offer a Web interface to check displays remotely, eliminating the need to drive around and double-check.

– Bob Brittan, Symon

The content-play report feature is an important component of a digital signage network particularly for an ad-sponsored digital signage network. The media players must be able to log every content play and deliver the logs to the digital signage server for reporting.

– Jimmy Dun, Dynasign

Systems monitoring and proof of playback should be a requirement of your network software and is available at some level in most enterprise-class systems. However, they are not foolproof. Certain displays do not facilitate RS-232 systems monitoring to let the software know whether the display is functioning properly.

– Brad Gleeson, Planar/CoolSign

Most digital signage vendors will tell you that you can monitor proof of play remotely and never need to visit a store. And it's true that top-tier digital signage software solutions have good proof-of-play capabilities built in, which are often "good enough." However, many things can occur in a store that cannot be determined remotely, such as another sign being placed in front of the digital sign, the sign being blocked by a pillar or an entire sign being moved into a storage area.

– Jason Goldberg, MTI

Many things can occur in a store that cannot be determined remotely, such as another sign being placed in front of the digital sign, the sign being blocked by a pillar or an entire sign being moved into a storage area.

Better digital signage systems offer the ability to log playback by the player and match that with a log that ensures the screens are also on, displaying the content. It still is important to consider physical compliance checks to make sure screens are actually visible. No systems today can account for holiday decorations that are put up and suddenly blocking all visibility to a perfectly operating digital signage display.

– Rocky Gunderson, SeeSaw Networks

Content can be verified and your display functionality can be checked in a number of ways. First of all, you can check

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through your content-management software. Most packages have monitoring a query capabilities built in to their functionality. The second way to check, monitor, verify and control your displays is through either KVM over IP solutions or signal distribution solutions that have RS-232 control built into them.

– *Dave Haar, Minicom Advanced Systems*

Checking system status with personnel is always the most assured way, but physical location is not important. Most sophisticated digital signage systems today include remote monitoring. Typically, monitoring includes visual assurance using streaming technology to verify operation of various channels. Additionally, warning systems will include audible or visual alerts on the digital signage control screen, by e-mail and SMS alerts.

– *David Little, Keywest Technology*

You can install remote software on the machines that are serving your sign — like a VNC client. From a central location on a network, you can port into that sign and see exactly what is playing on that screen. VNC can also provide an easy way to configure and troubleshoot signs from a remote location.

– *Chris Wren, The Phelps Group*

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How is content delivered from the player to a screen that is mounted tens or hundreds of feet away?

Content is delivered to screens from remote media players by vendors that offer video and serial control distribution over dedicated UTP (unshielded twisted pair) runs. The advantages are that UTP is smaller, easier and less expensive to pull than VGA or coaxial cable. Most commercial buildings today have a complete matrix infrastructure of UTP cable already in place. In fact, it can usually be run right over ceiling tiles and under carpets. In addition, the cost of the wire is far less than that of any of the other alternatives. Product is available that can deliver full-motion, real-time XGA video at 1,500 feet (450 meters). Even at this distance, the video quality makes it difficult, if not impossible, to differentiate between the remote and the local display.

– Bob Brittan, Symon

The Cat 5 wire-based and wireless AV distribution technologies that allow you to distribute the high-resolution AV signal as far as 1,000 feet away from the player. These technologies, such as ones from Minicom and Avocent, not only let you distribute the signals hundreds of feet, but also allow you to broadcast the AV signal to multiple receiving display points.

– Jimmy Dun, Dynasign

Why should you position the player so far from the display? By choosing a small player and positioning it in close proximity, you can avoid wiring and signal amplification problems.

– Chaim Fleischer, RePromotion

This situation is often overlooked and underestimated. Often, the cost of infrastructure, installation and maintenance can be equal to or more expensive than the cost of the signage equipment and software. If the network is being retrofitted to an existing building, a robust telecom infrastructure may not exist, or what does exist may be at a capacity not available to the signage contractor. Running dedicated network wiring is usually possible in modern buildings with drop ceilings, raised floors and telecom cableways. In an older building, this can be very expensive. Wireless is an option, particularly if the system can be configured as a “mesh” network, where each access point is both a receiver and transmitter. In this case, player PCs may need to be placed at these displays. If you can utilize Cat 5 distribution systems, these are not cheap, but usually less expensive than running dedicated video cabling.

– Brad Gleeson, Planar/CoolSign

If the network is being retrofitted to an existing building, a robust telecom infrastructure may not exist, or what does exist may be at a capacity not available to the signage contractor.

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Displays that are a short distance from the player typically use standard monitor cables (6 feet to 14 feet). Beyond that distance, a video distribution system is usually used. Depending on the video signal type and resolution, the distribution system may be passive or active. For moving signals long distances (often through small cable conduits), it's common to use a conversion system to put the video signal on one or more Cat 5 cables and convert it back to a native video signal at the end of the cable. For high-resolution signals and/or very long runs (greater than 1,000 feet), the video signal can even be sent over fiberoptic cables. Another common feature of video distribution systems is that they can be one to many, allowing a single player to mirror its output on multiple displays. MTI, Extron and Altinex are popular manufacturers of video distribution systems.

– Jason Goldberg, MTI

Most wired and wireless solutions will comfortably deliver content to screens that are tens of feet away. As for hundreds of feet, the best solution is to avoid this and place a player closer to the screen where the environment allows. Sometimes, the cost of cabling that distance to maintain quality can be more than an additional player. A good vendor will work within the environment to ensure an optimal design, providing the lowest total cost of ownership.

– John Griffiths,
EnQii/Digital View Media North America

The easiest and most cost-effective way to move signals over distance is using either Cat 5 extension or Cat 5 distribution systems. The advantage to using Cat 5 cable, besides the cost, is the fact that you can consolidate players and equipment in order to get better access to lower maintenance costs and provide a secure channel for remote access over IP to your players and servers.

– Dave Haar, Minicom Advanced Systems

You can run high-grade RGB cable about 100 feet before degradation becomes noticeable. Past this distance, there are several proven technologies that reliably transmit the signal up to about one mile. First of all, you may simply use an RGB cable amplifier, but the cost of the cable usually makes this approach less cost-effective. From about 100 to 1,000 feet, RGB over Cat 5 or twisted-pair technologies exist that can effectively and efficiently extend your range. Beyond 1,000 feet, most integrators would recommend the more expensive but superior fiberoptic transmission technology that can easily extend your digital signage picture degradation-free for about one mile.

– David Little, Keywest Technology

Cat 5e (standard network cable) is probably the best solution, as it requires little to no signal amplification in typical environments. But several technologies exist to boost signal to SDI, DVI, RGB and other types of signals.

– Chris Wren, The Phelps Group

PART 3 Content

I'm aware of news tickers and weather feeds — what other types of automatically generated, plug-and-play content sources are available for my screens?

While the news and weather feeds are widely being used on digital signage screens, you will soon be able to use the image and video feeds as more and more rich-media content are available on Internet and the cost of bandwidth drops further. Other rich-media content sources that can be integrated on the screens are broadcasting channels, cameras and video player devices such as Apple's iTV.

– Jimmy Dun, Dynasign

There are now virtually unlimited types of feeds that leading digital signage platforms can access and display. Again, if the sign is being used in a public location, certain license fees may apply, particularly for owned content such as professional sports scores. There are several brokers who can help a network operator sort this out. The format of much of this information can be pure data, so it's important that your software be power-

ful enough to allow you to reformat this data so you can display it with your designed content in a way that is attractive and consistent with the image you or the customer desire. A lot of networks allow for the data to be displayed, but the ticker is choppy or the fonts are limited. The use of good dynamic data can significantly enhance the value and reduce the content costs of a signage network, but the software platform must be selected carefully to ensure you are not compromising the overall performance and flexibility of the content and the network.

– Brad Gleeson, Planar/CoolSign

There are many types of syndicated content that are available for digital signage networks. These can be feeds that are relevant to the department where the digital signage is located (such as health and wellness content for a pharmacy sign), entertainment content to reduce perceived wait time at a POS terminal and environment audio content to set a particular mood.

– Jason Goldberg, MTI

A list of available feeds includes sports (NFL, NBA, NHL, MLB, NCAA football and basketball, PGA, NASCAR, sports

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headlines), news (top news, headlines, business headlines, science/health, entertainment, quirky news), weather (current conditions, seven-day forecast, 48-hour forecast, weather alerts, Doppler radar), traffic, general interest (computer industry news, “born on this date,” horoscopes, thoughts/trivia for the day), financial (market details, world financial highlights) and amber alerts. Don’t forget, most advanced digital signage systems can also source RSS feeds and retrieve data directly from HTML pages.

– David Little, Keywest Technology

One of the best emerging technologies available today for digital signage is a drop-in window in which content is accessible for interactivity by passers-by. Interactivity can be either immersive or non-immersive. In other words, a user’s body motion may simply change on-screen special effects, or a user’s image may actually be captured onscreen, where they can see themselves manipulate a sign’s background, images and special effects. This technology is a powerful



Dynamic content, such as real-time stock prices, gives digital signage immediate relevance and usefulness to the viewer.

tool to attract passers-by to, and engage them in, your digital signage solution.

– Vincent John Vincent, GestureTek Inc.

As long as you can serve up a streaming media source to the Internet, you can create plug-and-play content. Many people already do this — news outlets, specialty retail and other industry channels such as medical, travel, etc.

– Chris Wren, The Phelps Group

PART 3 Content

Can we show live television on our digital screens?

Many digital signage vendors support the live TV channel integration by installing a TV tuner or video capture adaptor in media player (certainly we do). The TV channel is displayed in a zone on the screen or shares the time slots with other contents in the same screen zone. Other digital contents, depending on the applications, could share the same TV channel screen in the form of side and/or horizontal banners. Taking advantage of the widescreen display panels and 4-by-3 broadcasting channel format, it is one of the popular implementations at many public venues such as sports bars and restaurants. However, one of the network broadcasting companies is investigating the legality of such usage of TV channels. It should be interesting to see how far they can push in determining where to draw the line regarding content use rights. Is it legal to place an ad poster next to the TV that is tuned to a major network TV channel?

– Jimmy Dun, Dynasign

Why would you want to?

– Brian Dusho, BroadSign

Certain applications and venues can benefit by including live feed of business or sports television surrounded by zones of programmed content such as tickers

It should be interesting to see how far they can push in determining where to draw the line regarding content use rights. Is it legal to place an ad poster next to the TV that is tuned to a major network TV channel?

or programmed advertising. Most software platforms allow the tuning of a defined zone to live video feed or stored MPEG video files, with the use of a video capture or tuner card. If the video is in a public space, you will likely be required to pay for a specific subscription to allow for the display of business television.

– Brad Gleeson, Planar/CoolSign

Yes. Advanced digital signage software with multiple zones can often allocate one zone to show the output from a video tuner to enable live television as a picture-in-picture solution. Another approach is to install a video switch in the store's video distribution network that can switch from the digital signage players output to the output of a video tuner. The switch can be controlled locally (by store staff), or remotely by the digital signage network management software.

– Jason Goldberg, MTI

Broadly speaking, live content can be integrated into digital screens in two ways — either live streaming or by the injection of a live feed. However, input via S-video, composite or DVI interfaces

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are more likely to be used currently as network congestion across the (public) Internet is unlikely to currently support as satisfactory end-user experience (especially when delivering to a large-screen environment). Please also note that there are potentially regulatory and licensing issues, depending on the nature of the content, the source and where the content is being played out.

– John Griffiths,
EnQii/Digital View Media North America

Yes. Many digital signage systems enable the input of video for live television. More sophisticated systems have television turners with RF inputs built in as well.

– David Little, *Keywest Technology*

There are a few ways to accomplish this technically and again ensure your DS provider can deliver this functionality in an automated manner with the ability to change remotely. For example, this live feed can be distributed through the local media player using the DS content-management software to manage the feed or you can run satellite or cable feed directly to the display screen and have the local media player control the displays to switch the input ports on the screen to broadcast live feed and/or scheduled content.

– Wayne Ruttle, *ADFLOW Networks*

Of course. Most likely, your signage application is managed by a computer program, rather than a live video switcher.

Most of the “live” feeds you see on existing digital signage are served as streaming media over a broadband connection. Several content providers can provide such streams to you — at a cost.

– Chris Wren, *The Phelps Group*