

# Cellular Digital Signage



**INSIDE:** For years, digital signage deployments relied on expensive, inflexible on-site network connections for content programming, delivery and ongoing management. Today, the widespread availability of cellular-based networks enables digital signage to be deployed virtually anywhere. In countless venues, cellular-based digital signage penetrates hard-to-reach markets, achieving a faster return on investment.

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3G Cellular Digital Signage

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# About the sponsors



**MediaTile** is one of the few companies in the world that provides a comprehensive, all-in-one digital signage platform that integrates an LCD HD display, media player, network access and a Web-based control system. MediaTile's unique offering is compelling to network operators as it dramatically simplifies the installation and operation of complex signage networks. The company does this with its patent-pending cellular digital signage technology, Digital-Sign-In-A-Box systems, Web-based Broadcast Portal and Enhanced Services and Support. With MediaTile, no additional software, hardware, networking, configuration or testing is required. Just add power — it's really that simple.



**Digital Signage Today**, 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

**W**hen it comes to the rapidly expanding world of communications, no one likes to deal with cables and infrastructure anymore.

When it comes to digital signage deployments, cabled and Wi-Fi networks may soon be as close to extinction as the telephone booth.

The bottom line is that cabled and Wi-Fi networks represent expensive deployments, increased costs and decreased practicality and flexibility. Hardwired infrastructure is difficult for IT departments to set up and manage. Too many components are needed, and any one of them can malfunction at any time. And today, having a digital signage network on a secure and separate network — a goal that is often unattainable on cabled or Wi-Fi networks — is critical.

But there's an even greater compromise: Cabled and Wi-Fi networks dictate not only how digital signage is deployed but also where it is deployed — and often where it can't be deployed.

For years, digital signage deployments were shaped by the limitations of the on-site network connection. If the signage was to be on a network — that is, if it required a remote update and management component — then it had to be located in an area that supported a hardwired network or

Wi-Fi infrastructure, complete with either hubs and cabling or individually configured Wi-Fi access points.

What exactly did that mean? That meant signage was found only in groups; it wasn't financially feasible to install the infrastructure needed to place individual signs in remote areas. There weren't any "Lone Ranger" displays — at least not any that were on a network.



By Travis K. Kircher,  
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**Digital signage networks that run on cellular-based broadband Internet support provide all of the capabilities of a hardwired network without its limitations or the burden on IT personnel.**

Some locations couldn't support networked signage at all because they couldn't get a network connection. Running a cable may have been too difficult, such as in the case of billboard displays, or Wi-Fi wasn't an option because the location was surrounded by concrete walls. In addition, transitory or mobile systems — systems that are constantly on the move and can't be tethered to a fixed location — also can't continually search for a Wi-Fi connection. For such systems, connectivity was impossible.

Impossible, that is, until recently.

Today's cellular-based networks offer unprecedented advantages to digital signage networks. Cellular technology makes digital signage more cost-effective, practical and flexible. Digital signage networks that run on cellular-based broadband Internet support provide all of the capabilities of a hardwired network without its limitations or the burden on IT personnel.

Thanks to this new technology, digital signage can be deployed virtually anywhere, even in the most remote locations. New meaning is given to the term "remote management." The reaction time of the network is shortened, maintenance alerts are provided instantaneously and the cost and complexity of the network is cut to manageable levels — whether the network is in an office in Manhattan or the remotest reaches of the Mojave Desert, as long as a cell tower is within 30 miles.

So what is a cellular-based network? And what can it do for your digital signage deployment? Those are the questions this guide is designed to answer.

We'd like to thank MediaTile, whose sponsorship of this guide enables us to bring it to you at no cost.

We hope that as you read through this guide, you'll be enlightened about the new realm of possibilities that has

been opened by 3G cellular-based networks.

# Chapter 1 Digital signage networks and connectivity

**W**hy integrate digital signage through a network?

Today, most digital signage deployments are networked. The advantages of a networked digital signage system are far greater than simply the cost savings; such systems also add value by their ability to update content, nearly in real time, and increase its relevance to the viewing audience.

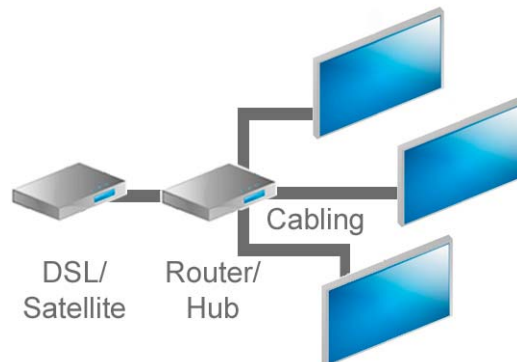
Why are deployers so quick to network their displays? Suppose the deployment in question involves 1,500 digital displays in more than 500 retail stores nationwide, and the deployer chooses not to network them. The content management situation becomes increasingly complex as more signs are added. New content will have to be reloaded to each of the signs on a regular basis to keep the messages fresh, especially if the content manager plans to daypart messages, providing different messages during different segments of the day.

In such situations, two major difficulties arise if the signage is not integrated into a network.

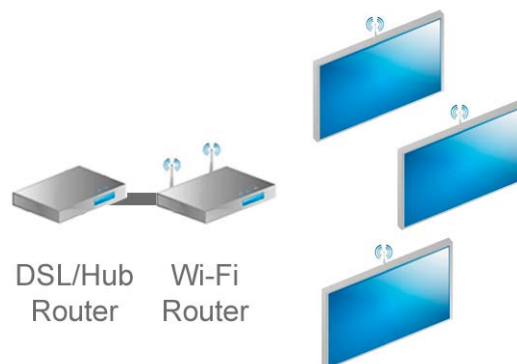
One difficulty is that changes have to be made on location to each of the displays. The content is not loaded once; it's loaded over and over again, usually by store managers who receive a CD-ROM or flash drive in a mailing. The failure or "non-compliance" rate in this situation is high, reducing the value

of the digital signage deployment to something just above that of a paper-based point-of-purchase display.

The other major complication arises when a display malfunctions. If a corporation is based in New York and a display in a Nebraska outlet is showing nothing but static, how long will it take for the IT department to fix the problem? Days? Weeks? How long will it take for someone to realize there is a problem? As long as the display remains inactive, all that content will go to waste.



*This diagram demonstrates how content is transmitted over a typical DSL or satellite network to the digital displays. Notice that cabling infrastructure is required to push the content to each individual display.*



*Compare the model in the previous diagram to this cellular-based digital signage network. Content is transmitted via a cellular signal to the various displays. Little infrastructure is required.*

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A cellular-based digital signage network provides a solution in both instances.

Integration in the form of a third-generation, or 3G, cellular network equips the deployer with remote monitoring and management capabilities, as well as the power to instantly update signage content at the push of a single button. The network can also send alerts as soon as a display begins to malfunction, making it possible to dispatch a technician to fix the problem before the store manager even notices. The repair may even be made online, using remote diagnostics tools such as an automatic reboot or a software upgrade.

These advantages are quickly being noticed by signage deployers.

“More and more, companies are beginning to see the true value of having their digital signage inexorably linked through a powerful IP network that is available anywhere,” said Keith Kelsen, executive chairman of Scotts Valley, Calif.-based MediaTile and chair of the Content Best Practices Committee for the Digital Signage Association. “The level of control that a network brings to the network administrator is very empowering.

“Having a network means you’ll always have the highest level of control on your digital signage deployments, no matter how big those deployments might be. Whether the display is next door or on

the other side of the world, you’ll know what’s going on at any given point in time,” he said.

A network enables digital displays to send and receive data to and from the administrator quickly. Most networks today, by and large, are Internet Protocol, or IP, networks — meaning that each display is given its own unique IP address.

**“Having a network means you’ll always have the highest level of control on your digital signage deployments, no matter how big those deployments might be. Whether the display is next door or on the other side of the world, you’ll know what’s going on at any given point in time.”**

— Keith Kelsen, executive chairman of MediaTile

Network connections take many forms. “Cabled” or “hardwired” networks link displays together through a series of Ethernet cables. Several different types of wireless networks use technologies such as satellites, Wi-Fi and cellular communications.

### Changing content

The advantages that an IP network brings to the ability to deliver and manage content and playlists — as well



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as to the device itself — are obvious. By uploading new content to a network, the administrator effectively sends that content to all of the displays on the network at once, without ever having to leave his seat. Contrast that with the alternative of having to send a courier with a CD-ROM or flash drive to upload the content to each of the displays, and the amount of time and money that is saved by having a network becomes clear.

This becomes even more significant when you consider that rapidly changing content is an important ingredient for any digital signage deployment that aims to catch the eye of today's impatient consumer.

"In order to make that sign or that display as productive as it can be, you have to keep the content fresh and relevant, and you have to be able to send different content... continuously on the fly," said Brad Gleeson, vice president of business development at Beaverton, Ore.-based Planar Systems Inc.

Philip Luzbetak, president of New Lenox, Ill.-based Pallyn International Inc., confirmed the significance of that capability. Last year, while he was out of the country, he was able to access the company's content management system from China and update the content for a U.S. customer.

IP networks facilitate changing content on the fly. Not only can new information

be displayed to reflect special sales and new product offers, but the network also can incorporate real-time news, weather or sports feeds. And it can tie content to inventory numbers. So if a store runs out of Alpo canned dog food, the network automatically prevents the displays from running dog food ads.

**There's no doubt about it: Infrastructure causes a lot of headaches. The network will have to be tested, software must be loaded and once it's activated, the network will have to be configured to the devices it is supporting.**

Another significant advantage is the ability to react swiftly in case of emergencies. Suppose a meat-packing company issues an immediate recall of a particular product made by its label because of contamination concerns. If that's the case, the deployer doesn't want the signage to run ads that portray a smiling child consuming the product. But with a network, the deployer can replace that ad with a more appropriate one. The problem is solved quickly and, more important, without any collateral damage to the deployer's brand.

Perhaps one of the more interesting benefits of an IP network is the ability of the signage deployer to engage in dayparting — the practice of changing content based on the time of day.



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“Dayparting is another often-overlooked benefit of having your signage on an effective IP network,” Kelsen said. “By employing a scheduling application, you have the ability to display different content at various times of day. In the morning, when you have a lot of older shoppers, you can run advertising targeted to that demographic. In the afternoons, when kids are getting out of school, you can market to the ’tween and teen crowd. Signage can go after a more mixed demographic in the evenings.

“Even your sales teams can benefit from the ability to change content quickly,” Kelsen added. “You can completely retool your signage so that it runs training programs for your sales associates in the early morning hours before the doors open.”

### Remote management

One of the most significant tools handed to the administrator by the network is the ability to know the condition of a single display at any given time. If the display malfunctions, an alert can be automatically e-mailed to the administrator, letting her know something is wrong. Some repairs, such as reboots and software updates, can be handled from the administrator’s laptop, while others will require a technician to work on the display. Either way, the alert can ensure that this happens quickly.

“The power to know immediately when one of your displays is down in today’s competitive landscape is an absolute necessity,” Kelsen said. “Alert notification and online maintenance



*Rolls-Royce deployed a cellular-based digital signage solution for an internal corporate communications broadcast network throughout two 1-million-square-foot manufacturing facilities in Indiana.*

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sees to it that you won't have to worry about a sign going out — and staying down — without your knowledge.”

Remote management involves more than spotting trouble. Used correctly, it can help a deployer gauge the effectiveness of digital signage. Reports can be generated describing which ads were displayed at a certain time and for how long. This can be paired with point-of-sale data to determine the effect those ads had on viewers. And if the narrowcaster or network operator is selling ad space across the signage network, this information can be used for billing purposes.

### Infrastructure problems

Unfortunately, IP networks have their limitations — specifically, the more traditional IP networks such as Ethernet, Wi-Fi and satellite networks. Wi-Fi and Ethernet networks require infrastructure and tech support. The problems include high cost and lack of convenience.

Chuck Gose, an employee of MediaTile and a former internal communications manager for United Kingdom-based Rolls-Royce Corporation, a deployer of a cellular-based digital signage network, said Rolls-Royce is an example of a company that got fed up with the extra baggage that Ethernet and Wi-Fi networks bring to the table.

“The cellular-broadband technology... ended up at one-third of the cost of

a traditional hardwired installation, which would have cost about \$500,000 to \$600,000,” Gose said. “From the corporate communicator's chair, it's a natural fit. Using MediaTile's (cellular-based) technology not only saved us money by not needing additional IT infrastructure and installation, but it reduces the challenges of managing content, thanks to the user-friendly broadcast portal.”

There's no doubt about it: Infrastructure causes a lot of headaches. Operations likely will be disrupted in some form as cable is laid and furniture or equipment is repositioned to facilitate the installation. The network will have to be tested, software must be loaded and once it's activated, the network will have to be configured to the devices it is supporting.

The attention can't stop just because the network is up and running. Servers crash, cables get unplugged, routers fail and access points experience interruptions. When a thunderstorm knocks out the power, who will reboot and resynchronize everything? All of that costs time, manpower and money as technicians dig in to solve the problems.

### Riding piggyback

The complicated web of cables and hubs that make up Wi-Fi and Ethernet networks often can tempt the digital signage deployer to take a quick

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shortcut when setting up the on-site network. Instead of developing a separate network to run the signage, the deployer might choose to connect the network to an existing network in the store. In essence, the signage will piggyback on the operational network that runs the store's POS systems or back-office automation platform.

This is not necessarily a bad thing; much of the necessary infrastructure is in place, and all the deployer needs to do is connect to it. However, problems can arise quickly.

To start, there's the issue of security — a big consideration when launching any business endeavor but absolutely critical when it comes to IP networks. Without proper protection, digital signage can provide a backdoor for hackers to get into the network. If the digital signage network is on the same network that hosts the deployer's intranet system, such an intrusion could constitute a massive security breach.

The seriousness of the breach becomes clear in a scenario such as this: An identity thief uses the lack of security in the signage network to hack into a hospital's internal network, gaining access to medical records and violating patients' privacy. Similarly, a bank's hacked network could yield personal financial information and bank account numbers.

"Banks and hospitals have much to gain from using a cellular-based digital

signage solution," Kelsen said. "But they're not the only ones at risk when you fail to keep your signage network separate and secure. Retail stores often keep proprietary information on their internal networks, and that can be a smorgasbord for malevolent hackers."

In a high-profile case in early 2008, hackers allegedly obtained VISA information from more than 45.7 million cardholders through Wi-Fi connected displays and kiosks at TJ Maxx, illustrating what can happen when businesses deploy unsecured networks.

**"Built-in cellular broadband capabilities eliminated the need to network each location, so we were able to deploy our community TV network in about half the time and at about half the cost of traditional systems."**

**— Dave Maday, a partner in the Spot Media Group**

In addition to security concerns, bandwidth issues can be a problem. If the digital signage deployed in an electronics store downloads and runs lengthy full-motion video, the massive files will use a lot of bandwidth. And if the signage and corporate intranet are on one network, the video will use up precious bandwidth that the store needs to conduct day-to-day operations, from uploading transactions to downloading new price and product databases.

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“There’s just no way around it,” Kelsen said. “A shared network might work in some rare instances, but your best bet is placing your digital signage on its own network. Of course, running two networks can be cumbersome when using Ethernet or Wi-Fi connections, making cellular the preferred choice.”

### **‘X’ marks the (impossible) spot**

Finally, it’s sometimes impossible or not feasible to install Ethernet or Wi-Fi in some locations. Don’t believe it? Try installing an Ethernet connection on an outdoor digital billboard. How about a vendor’s endcap at a wholesale store — or a temporary display booth at a convention?

In many isolated locations, it’s not possible to run a data connection. Expensive satellite connectivity could be an option, but the quality of the connection is contingent on several factors, including the weather.

A number of things need to be considered when assessing a traditional IP network.

“You have to worry about potential hacking, viruses, players,” Luzbetak said. “If you’re running on a corporate network, you have to take bandwidth and firewall considerations. So there’s a lot to look at in your players and in your network. From an operational standpoint, how reliable is it going to be? How vulnerable will it be?”

“If you’re using an internal network, like a private network — let’s say a company has all their own internal stuff — you also have to work with all of your internal IT people. Are you going to have firewall and bandwidth issues depending upon what kind of content you’re going to be moving around within that internal network?” he asked.

But there is a third option: cellular-based connectivity.

“A cellular-based network provides all of the advantages of Ethernet and Wi-Fi without getting tangled up in complicated infrastructure,” Kelsen said. “There are no cables. There are no hubs and servers. We not only believe it’s the best option — we think that any solution that offers zero in-store or on-site wireless technology is the only option and the real future of connectivity.”

Just ask Dave Maday, a partner in the Spot Media Group, a York, Pa.-based community narrowcaster that recently deployed a community network.

“Built-in cellular broadband capabilities eliminated the need to network each location, so we were able to deploy our community TV network in about half the time and at about half the cost of traditional systems,” Maday said. “With our community network, we can deliver a more effective advertising medium than traditional cable television, when you compare (it) against such factors as target, reach, captive audience and cost.”

# Chapter 2

## The business advantages of cellular networks

No smart business owner makes a significant decision without first evaluating what kind of effect that decision will have on the welfare of the company. How much money will it cost? What resources will be required? How will it affect the company's ability to carry out its corporate mission?

In short, what are the advantages of choosing that option?

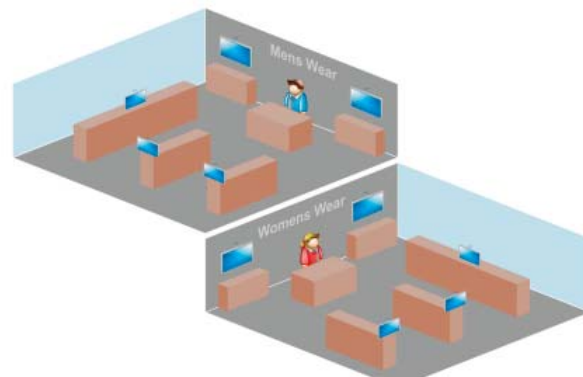
The decision to go with a cellular-based network for a digital signage deployment also depends on the answers to those questions. It's important to understand exactly what advantages that network can bring to the signage deployment.

Cell phones are the most obvious example of a product that runs on a cellular network. But cellular technology also can be used as a means of connecting to data networks, including the IP networks that manage and maintain digital signage.

A cellular network essentially divides up land into small areas or "cells." Cell sizes vary, but a typical cell might be about 10 square miles. Each cell contains a base station, consisting of a cell tower and radio equipment.

Those cell towers act as low-power transmitters that send out radio waves that can be used to communicate with a transceiver such as a mobile phone or a data network.

The advantages of a cellular communications network are easy to see. Cellular networks have a nearly unlimited range. The low frequencies of the cell towers, combined with the multitude of cells, means that as a cell phone user moves out of range of one tower, his mobile device can switch to the next cell tower in the adjacent cell. With this method, he could carry on a conversation for hundreds of miles without a break in reception, as long as he stays within areas that are serviced by cell towers.



But cellular networks have another significant application. They can provide online Web access and a dynamic IP connection for devices. Computers of the past used sluggish dial-up landline connections to access the Web. More recently, they've been using static and dynamic IP addresses with configured security on each device. Cellular technology can replace that connection and do so in such a way that is faster and much more secure.

*Cellular-based digital signage can be placed virtually anywhere due to the lack of any cabling. Even aisle endcaps are not off-limits.*



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### A network that's (nearly) everywhere

Perhaps the most significant advantage of a cellular network is its pervasive reach. The only requirement is that the networked device be within range of a cell tower, and in today's rapidly expanding communications market, areas out of cell range are becoming rare.

"The important question you have to ask yourself when evaluating the different types of network connections is this: Why go through the hassle of deploying a network when one already exists around you?" asked Keith Kelsen, executive chairman of Scotts Valley, Calif.-based MediaTile.

"Just about every major carrier is offering cellular-based broadband services now. When you think about the man-hours, the costs and the disruptions of having to lay out a Wi-Fi or Ethernet network at each location where you plan to deploy signage, you're going to be hard-pressed to justify that expense over the ease and simplicity of cellular."

In the future, it will make little sense for a digital signage deployer to build and manage her own on-site digital signage network. That level of involvement will be a novelty, a throwback to the past.

In fact, cellular carriers have already provided the infrastructure, spending

billions of dollars to build the equipment needed to make this network possible. The base stations are there, the cell towers are there, the radio equipment is there. The project is 90 percent complete; all that remains is for the digital signage deployer to make the decision to use the network.

**"The important question you have to ask yourself when evaluating the different types of network connections is this: Why go through the hassle of deploying a network when one already exists around you?"**

**— Keith Kelsen, executive chairman of MediaTile**

Anyone who has ever had to run Ethernet cable knows what a hassle it can be. Cable sometimes must be stretched across the ceiling, a labor-intensive job. But running cable along the floor is no better; there's really no good way to hide cable. Snaking it behind counters and under desks requires moving furniture and causing general disruption. Cables can also be an eyesore, a safety hazard and an overall annoyance to employees and customers alike.

And the infrastructure costs money. Using Ethernet or Wi-Fi means shelling out a lot of cash for hubs, routers, switches and cables. Computer equipment will always be an expense,

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but with cellular networks that expense is reduced since service providers bear the infrastructure costs. With traditional networks, the deployer pays the price.

“Cellular-based digital signage enabled us to deploy a facility-wide broadcast network quickly and easily, without the need to add networking or connect the signs to anything except power,” said Brian Stickel, marketing director at Knoxville Raceway. “Getting the entire system up and running took less than a day and was deployed without any reconfiguration of our facility.”

### Ready to go

There’s not a lot of equipment to deploy, saving the deployer a significant amount of time. Unlike conventional IP networks, cellular networking can be completed in a single afternoon — often in a matter of minutes. That’s not the case for Ethernet or Wi-Fi.

“Let’s say you’re going to deploy digital signage, and you decide to integrate it into a conventional IP network,” Kelsen said. “That installation is going to require two teams. You’ll need an IT team to install and configure the network itself — and that will likely take four to eight man-hours of labor. In addition to that, you’ll need someone to install the actual sign. In the case of a cellular network, the first step is removed. That saves time — a lot of time. And unlike a Wi-Fi deployment, it’s

extremely unlikely that you’ll ever have to send a repair technician to the field.”

### Plenty of bandwidth

Bandwidth is like a long, dark tunnel through which data is relayed back and forth. The bigger the tunnel — i.e., the greater the bandwidth — the more information can be sent at any given time. Trying to force too much data through a low-bandwidth connection results in a traffic jam.

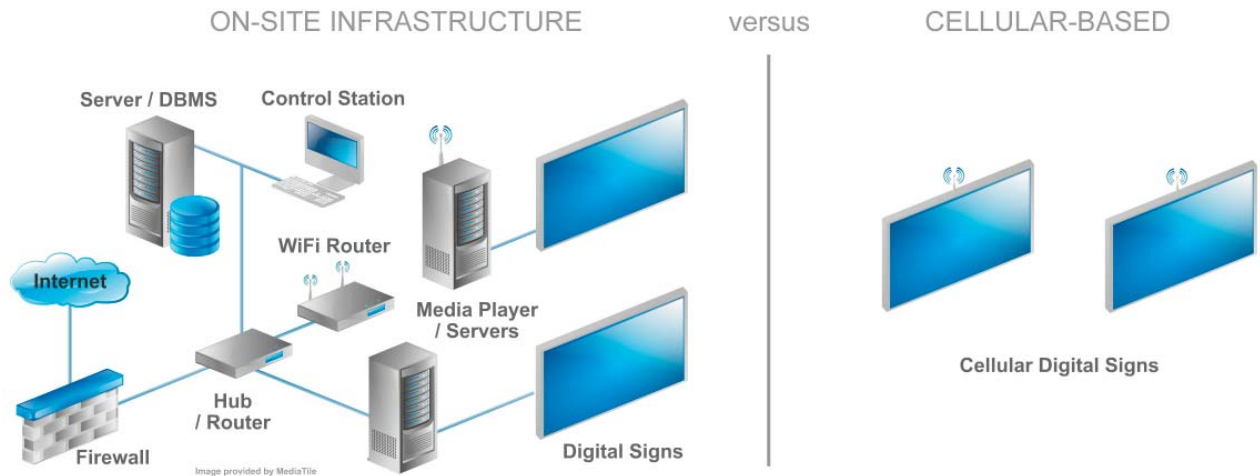
Cellular networks facilitate a high amount of bandwidth for uploads and downloads. Because they are able to use the latest technology, cellular data networks can support peak download data rates of up to 3 megabits per second (Mbps).

In addition, cellular networks use the “store and forward” technique of deploying media data, through which digital content is transferred directly to every display that needs it. The alternative, used by most conventional IP networks, is streaming content to the displays in real time (or sent to an on-site server that then streams the content to each of the signs on the local network). This model is prone to “staggering” or dropouts (loss of signal) and can’t be used to transmit high-definition content.

The store and forward method requires less overall bandwidth (since it typically downloads in the background and



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doesn't require a real-time live playout) and thus delivers a smooth and seamless playlist with no interruptions, a less likely result when using the streamed method.

Bottom line: With cellular-based digital signage, scalability — the ability to handle increasing amounts of data — is not an issue.

“Sprint Mobile Broadband EV-DO Rev. A provides users with expected average upload speeds of 350 to 500 kbps (versus 50 to 70 kbps with EV-DO Rev. 0) and download speeds of between 600 kbps and 1.4 mbps (from 400 to 700 kbps),” said Dennis McSweeney, area vice president for Reston, Va.-based Sprint Nextel. “Peak download data rates increase to 3.1 Mbps (from 2.4 Mbps), and peak upload data rates increase to 1.8 Mbps (from 153 kbps). To compare these Rev. A speeds against the speed of their current connection, Internet users can visit [www.sprint.com/speedtest](http://www.sprint.com/speedtest).”

### Freeing up the IT staff

A distinct advantage of a cellular-based digital signage network is that it doesn't need supervision, unlike Wi-Fi or Ethernet networks that have a number of complex components requiring maintenance. Replacing those components, which may require the help of technicians, can be costly.

By contrast, cellular networks have very few component parts — essentially a cellular network card. Most of the infrastructure is packed into the cell towers, and those are maintained by the carriers.

Even software upgrades and updates are handled more simply through a cellular network. With cellular, it's no longer necessary for a technician to visit each digital signage deployment to upload the newest update to Flash Media Player. Updates can now be transmitted online from corporate headquarters — or even from the network administrator's home.

*Multiplied by hundreds or even thousands of locations, infrastructure-based digital signage networks require significant investment and management as compared to cellular-based networks.*

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All of this offers a distinct advantage, particularly for a company that can't provide its own IT personnel but needs to deploy signage remotely.

### Freeing up bandwidth

Anyone who has ever e-mailed a large media file to coworkers knows the difficulties that arise from having a connection with limited bandwidth.

Hours after the e-mail is sent, the server is still transmitting the data, and the network is completely tied up. Other critical communications end up suffering from network latency, and employees' mailboxes are frozen as the file downloads.

Imagine what would happen if multiple video and graphics files were sent over the business network every day. It could be disastrous, drastically slowing down day-to-day business operations. That's a potential problem on many Ethernet and Wi-Fi digital signage networks.

Large multimedia files are essential for effective digital signage deployments. To catch the consumer's eye, high-resolution content must be presented in a visually engaging and dynamic format. Full-motion video is a must. The content must be new and fresh. Providing that means sending large files over the digital signage network.

If the digital signage network and the business network are shared, sending

digital signage content runs the risk of slowing down business operations.

### A separate footprint

Even more disturbing is the possibility that a digital signage deployer may inadvertently — or intentionally — access proprietary material through the shared network.

"Imagine the consequences if visiting IT maintenance personnel found technical schematics for a soon-to-be-released product line," Kelsen said. "It would be a serious breach.

**"The benefits are a true 'plug-and-play' solution. If you have power and a cellular signal, you have a live digital signage network."**

**— Jason Cremins, chief executive of Remote Media Limited**

"Even worse, consider a hospital where the digital signage network becomes a gateway through which confidential patient information could be accessed. That's a HIPAA (Health Insurance Portability and Accountability Act) violation, and the hospital could find itself in serious legal trouble. That's why hospitals are legally required to keep patient information on a separate network protected by a firewall."

But shared networks are common when conventional IP methods are

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used. While it's possible to create an Ethernet or Wi-Fi digital signage network that is separate from the business network, it is not always cost-effective or logistically feasible to do so. Thus, many companies wind up compromising the integrity of their business networks.

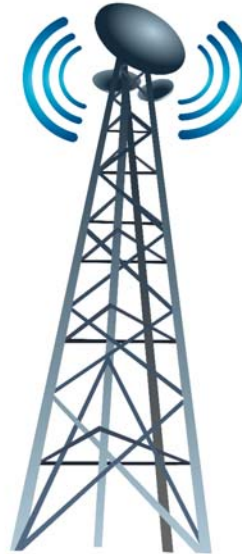
Cellular offers a more secure alternative by using a separate network that can be accessed easily and cost-effectively. With a cellular-based digital signage network, the deployer doesn't have to worry about bogging down the business network, scheduling content transmission at a particular time or allowing access to private material.

### Effective security

A virus can be bad enough on a computer, but imagine what it can do to a digital signage deployment.

In today's high-tech environment, information is everything — and hackers get their kicks by poisoning networks with bad information. Conventional IP networks must be armed with several weapons to keep them out, such as firewalls, virus protection software, adware detection, passwords and a host of other tools.

Cellular networks take a different approach. They communicate directly from the display to the cell tower and then to a secure Internet connection at a carrier-based level. By contrast, most Wi-Fi and Ethernet-based digital



*Why create and manage an on-site network when one already exists virtually everywhere?*

signage networks utilize a persistent IP connection, making it easy to be detected, accessed and abused by hackers.

“Sprint Mobile Broadband EV-DO Rev. A networks provide inherently robust security for data applications and messaging systems,” McSweeney said. “Sprint employs a CDMA wireless technology authentication and identification system for top-notch security. The Mobile Identification Number (MIN) and Electronic Serial Number (ESN), together with CDMA spread spectrum technology, make it virtually impossible for unauthorized users to capture and decipher messages, data and other sensitive information.”

Carriers continue to invest billions of dollars to protect the integrity of their cellular signals so the deployer doesn't have to shell out money for firewalls

or virus protection for a digital signage network. Instead, digital signage on a cellular network can be given a new IP address periodically, making it more difficult to track. Data traveling over a cellular network also can be sent using Secure Sockets Layer, or SSL, cryptographic protocols that protect data from eavesdropping, tampering or forgery.

“GSM encryption has never been broken in 17 years,” said Alex Brisbane, president and COO of KORE Telematics. “Application service providers use virtual private network (VPN) connectivity from network centers to their own servers. Encryption of applications is also viable.”

Cellular security has matured so rapidly that network security is no longer a primary concern, said Michael Voellinger, vice president of mobility for Telwares. “There are gaps in all platforms, mobile or fixed,” he said. “Every generation of wireless becomes more stable and secure, driven largely by the march toward convergence with other mobile and fixed-delivery platforms. Even newer pervasive applications like VoIP have become subject to malicious behavior. Encryption levels are high, but as with any technology, the true test and ultimate success will be in the implementation process and the safeguards that are actively used in the process.”

## Cellular Digital Signage



### A thriving technology

Cellular technology has improved to the point that for millions of individuals, cell phones are their primary, and sometimes only, phone. It's constantly improving and adapting; a few months — maybe even a few weeks — from now, it will be faster, more compact and carry greater bandwidth.

By today's standards, the first cell phones were cumbersome. They couldn't be used to take pictures, send e-mails, download ringtones or access the Web. Early 1G (first-generation) phones ran on analog radio signals and didn't have high-quality audio. But in a relatively short time, cellular phone technology has improved immensely.

*MediaTile's Digital Sign in a Box application can be set up in a matter of minutes.*

## Chapter 2 The business advantages of cellular networks

Adaptability and improvement are generally signs of a thriving technology. Cellular networks continue to improve; 4G (fourth-generation) cellular networks are gaining popularity. There is no formal definition for what 4G will represent, other than that it will provide voice, data and multimedia services to users at lightning speed, regardless of the location of the phones. When that happens, users can expect to see live video feeds and two-way communications on digital screens.

### **Mobility anywhere and anytime**

Perhaps the most significant advantage of a cellular-based digital signage network is the fact that the deployer can place the signage anywhere; there's no need to have the signage tethered to cables. Ethernet and Wi-Fi networks may perform at acceptable levels, but moving them presents a challenge if the location is reconfigured. A store manager may choose to move cash registers, product counters, clothing racks and snack machines, but finding a new site for digital signage that is wired into an Ethernet network is limited to where the cable can reach.

"We are extremely excited about the tremendous communication advantages that cellular-based digital signage solutions provide to both businesses and consumers in Africa," said Mauro Mercuri, general manager of Tactile

Technologies in South Africa. "With our business partner Vodacom, we have eliminated virtually all of the technical barriers associated with IP-based digital signage networks and thereby opened the market to far more businesses."

All cellular networks are free of those technical barriers.

"You can put MediaTile displays on the countertop, hang them on the wall behind the countertop, put them on a shelf by the front of the store, in the lobby, in the warehouse, break room, waiting room — you can move them around wherever you like," Kelsen said. "In retail environments, this provides enormous flexibility, as there are many more options for in-store placement."

Jason Cremins, chief executive of Remote Media Limited, agreed.

"The benefits are a true 'plug-and-play' solution," he said. "If you have power and a cellular signal, you have a live digital signage network. Remote Media has utilized cellular technology for fixed digital signage installations where a fixed line is not an option, due to the unavailability of service such as vending machines with digital screens or security implications. We have also utilized cellular for temporary installations and promotions where the installation costs and minimum contracts associated with ADSL connections are not viable."

## Chapter 2 The business advantages of cellular networks

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### **True value**

The critical questions are always these: How much does it cost? How much do we gain? What is our return on investment? What is the total lifetime cost?

Cellular-based digital signage networks have an advantage over other IP networks in that there are no hidden software costs or upgrade fees. The only cost is a flat monthly fee that covers the data service license and the cost of operations. The payment plan is cost-effective and simple — because it's typically built into the price.



# Chapter 3 Cellular-based digital signage in the real world

The beauty of cellular-based digital signage in the real world is the deployer's ability to gain critical information directly from his target market. Not only can he aim his messaging directly at them, but he can also gain feedback as well. It is almost a hybrid of online marketing and traditional broadcast marketing.

It does no good to deploy signage advertising products that the customer is never going to use or have an interest in. If the typical customer at 4 p.m. is a 14-year-old skateboarder who likes grunge music and beef jerky, the deployer doesn't want to be running ads for false-teeth adhesive.

In this real-world environment, market specialization is a key. This means the market segment to which a particular good or service is targeted, mainly defined by age, gender, geography, socio-economic grouping or any other combination of demographics and behavioral information when available. While market segmentation can be accomplished in many ways, depending on how the deployer wants to slice the pie, three of the most common types are:

- Geographic segmentation, based on location
- Demographic segmentation, based on statistics, such as age or income
- Psychographic segmentation, based on lifestyle preferences, such as urban dwellers or pet lovers



The first step is for the deployer to do the research that will help her define and zero in on her target market. Defining a target market requires market segmentation, the process of pulling apart the entire market as a whole and separating it into manageable units. The deployer needs to:

- Determine the characteristics in the target market, then separate these segments in the market based on these characteristics.
- Check to see which market segment is dominant; that may vary by times of day, so the deployer must consider scheduling content for different groups during different dayparts.
- Develop a specific marketing strategy to target this market with relevant messaging. Who are the customers? What is their attention span? Why are they there? What are their needs? What products are they looking for?

*A digital display is an excellent channel through which a business can communicate messages to customers or employees. Notice the lack of any cabling required by the cellular network.*



## Chapter 3 Cellular-based digital signage in the real world

When a deployer does his homework before taking the plunge and installing the signage, the project will run more smoothly — and that will result in a greater return on investment.

### The retail environment

The possibilities for cellular digital signage in the retail environment are unlimited. Retail stores generally sell a host of products from different manufacturers. Digital signage can run advertisements for any of those products. Some stores make money by selling advertising space on their signage to the vendors whose products are on the shelves.

Retail stores that have their own brand can use digital signs effectively by creating a customized buyer experience. The signs can feature experiences, pricing and values that are unique to the hosted environment and alert shoppers to special sales, new product offerings and customer reward plans.

Cellular-based digital signage offers a distinct advantage to the retail industry because of its simplicity. Most retail stores don't employ an on-site IT department, so the lack of infrastructure is a plus. The benefits include:

- **Control:** The ability to control the secured network remotely allows for consistency across all markets.

- **Flexibility:** Cellular-based digital signage adapts to the environment instead of the other way around.
- **Stability:** The option of permanent placement just about anywhere offers numerous options.
- **Replication and replacement:** Typically, the signage is a self-contained unit, so it can be easily replicated or replaced.
- **Updates:** Cellular-based digital signage is instant and offers the ability to change promotions immediately for various products or particular customers.



Individual brands benefit as well. The dynamic visual experience created by cellular-based digital signage can also build a retail brand in any store. The ability to influence customer behavior, provide relevant information and allow the customer to virtually experience the brand should increase sales.

*Digital displays can be effective marketing platforms in retail locations, particularly where shoppers are waiting in line.*

## Chapter 3 Cellular-based digital signage in the real world

Cellular-based digital signage networks can significantly enhance the consumer experience, building brand value and sales at the shelf. Providing the content needed to attract and influence consumers at the point of decision can make a significant difference in the sales outcome. In addition, a manufacturer can provide a direct channel to train sales associates.

Retail brands and brands in retail gain the advantages of a cellular-based digital signage broadcast network through:

- Increased sales, chain-wide and per store
- An enhanced overall consumer experience
- The ability to attract and influence consumers at their point of decision
- The ability to build brand equity with videos, lifestyle selling and targeted promotions
- The centralized creation and schedule of playlists for specific market and store demographics
- Quick and effective communication; stores can easily run a one-day promo or special
- The capability to train associates during off hours

### Brands and vendors

The fact that cellular-based digital signage works on a separate network

from a company's business network (one that's dedicated to day-to-day operations, such as its e-mail, server or Internet connection) is significant — especially to brand vendors whose products line the shelves of a retail store.

**Cellular-based digital signage can complement kiosks. Some interactive kiosks incorporate digital signage with touchscreen displays; others simply require the signage as part of the user interface.**

For the first time, vendors can deploy their own cellular-based digital signage network easily and cost-effectively inside a retail outlet. This means that brands can control their own programming, creating targeted dayparting and scheduling to their segmentation plan. This creates a powerful opportunity for brands. Now, the brand can reach out to the specific demographics and psychographics of its consumers at the right time and place.

By using a cellular network, the brand's network and the store's network are separate, meaning that the retail store doesn't have to worry about the brand vendor viewing proprietary information and vice versa. The opportunity for the brand to take control of its own destiny and to deploy its own signage — often

## Chapter 3 Cellular-based digital signage in the real world

termed “endcap networks” — can mean increased sales and brand awareness.

### Kiosks

As the self-service industry continues to grow, electronic kiosks are increasing in popularity. Consumers can use kiosks to pay their utility bills, purchase concert tickets, top off their cell phone minutes and custom-burn DVDs.

New kiosks are popping up every day, with many of them in somewhat remote locations. A consumer may find a kiosk at a rest stop, a park welcome center, an airport lobby or a fast-food restaurant. These days, they seem to be everywhere — particularly in both isolated or high-traffic locations.

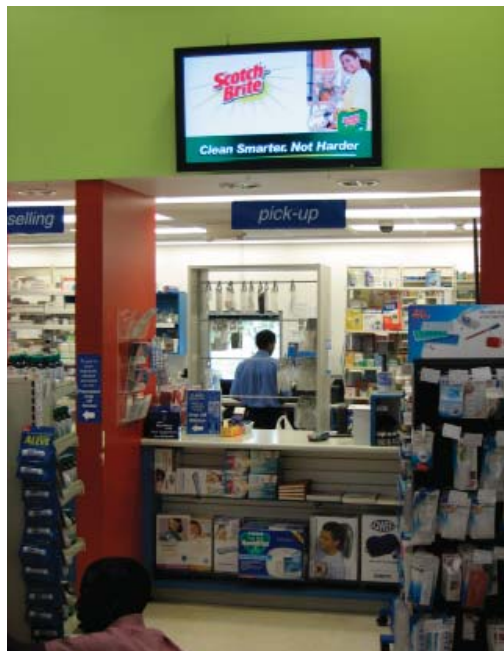
Cellular-based digital signage can complement kiosks. Some interactive kiosks incorporate digital signage with touchscreen displays; others simply require the signage as part of the user interface. The key to kiosks is a combination of ease of use and relevant offerings. Unlike consumers who surf the Web at home, in most cases kiosk users are standing and may become impatient. A quick and efficient user interface is crucial, or the consumer will become impatient and walk away from the kiosk.

In the past, the remote locations of some kiosks have made it difficult to integrate them into a network. There wasn't a network drop, and the logistics of running cabling, hubs and routers

nullified the possibility of an Ethernet or Wi-Fi connection. Cellular technology has changed all of that. Cellular broadband provides the maximum amount of flexibility without the bulky infrastructure. Now kiosks can be remotely managed no matter how far-flung the location.

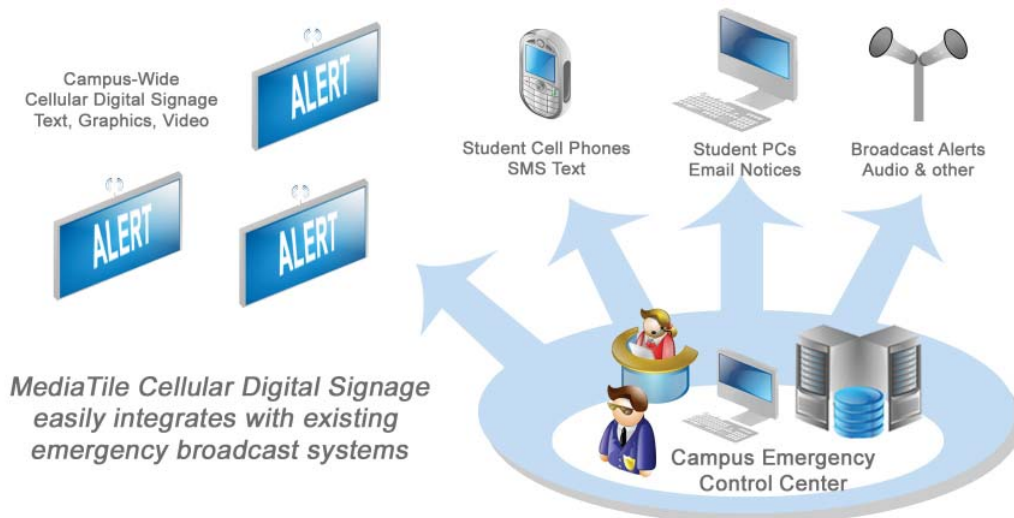
### Waiting rooms and break rooms

Waiting rooms and break rooms are often seen as the crown jewels of cellular-based digital signage locations. They have all the necessary requirements to ensure a captive audience. While customers are waiting, the deployer can engage them with relevant and entertaining content. And the deployer can relay critical news, required regulatory information or even employee training data to the private break rooms.



*Cellular-based digital signage deployed in pharmacies in the Caribbean is ideal when the existing network cannot be accessed and used for anything other than store operations.*

## Chapter 3 Cellular-based digital signage in the real world



*Cellular-based digital signage is an excellent means of alerting students or employees of a pending emergency. Digital displays are both dynamic and attention-grabbing.*

Waiting rooms in automobile repair shops, professional offices and other locations always have been a popular place to educate, inform and sell customers on new products and services. In the past, this was done through televisions that played ads stored on DVDs. The problem was that television screens simply aren't built for that kind of wear and tear, and burnout and image retention soon became issues. It wasn't long before they were replaced with flash-memory-based display systems, but as those networks grew, it became difficult and costly to update or change the content.

Enter cellular-based digital signage. Digital displays have the longevity and durability to make this sort of continuous messaging and viewer relevance possible. It soon became clear that having that signage on a cellular network was the only practical means of deploying those displays.

Adding digital signage to a pre-existing local area network, or LAN, wasn't feasible due to security, firewalls and ongoing management and support issues. The separate and distinct nature of a cellular network served the needs of the real world.

### Healthcare and academic environments

Healthcare environments are a special category for cellular-based digital signage due to the strict guidelines for secure networks they must adhere to. HIPAA mandates that a patient's health data be kept in the strictest of confidence. A hospital that violates that privacy, or allows such a violation through security negligence, could find itself in the center of a costly lawsuit.

Hospitals, pharmacies, doctors' offices and other professionals in the healthcare community benefit

## Chapter 3 Cellular-based digital signage in the real world

from the separation of cellular networks from business networks. The risk of sensitive data finding its way into the wrong hands, either maliciously or accidentally, is reduced; cellular networks feature remote management without headaches of data mismanagement. In these environments, cellular-based digital signage systems:

- Are on a separate network and therefore HIPAA-compliant.
- Are kept separate from the existing on-site IP-based network.
- Provide the flexibility to move displays as layouts are rearranged or moved to new locations.
- Access their own Web portal to manage vendor promotions and create a new form of advertising or informational network.
- Can be used for staff training during patient off-hours.

Cellular broadband services also work well for communication and broadcast systems on academic campuses. Cellular-based digital signage can be deployed quickly and easily on both private and public educational campuses and can be used to immediately warn students of an emergency, such as severe weather or an on-campus fire, giving them critical information on what to do. A system with built-in cellular-based IP

networking would not require rewiring the campus.

### Financial institutions

Given the turmoil in the financial services industry, there is a critical need for relevant information at the branch level. In the midst of this shift, how can financial institutions, or FIs, keep their customers aligned and informed? Cellular-based digital signage networks facilitate context-relevant messaging that can be delivered to the target audience at the location.

**Its cost-effectiveness, security and dependability are rapidly making cellular-based digital signage the preferred choice of banks and credit unions.**

As with the healthcare segment, privacy is also highly regulated for banks and financial institutions. In addition, banks and credit unions often don't have on-site IT professionals to manage and maintain a digital signage system. Firewall issues alone make it impossible to coexist without a separate network.

It's not surprising that this industry is turning to cellular-based digital signage. Its cost-effectiveness, security and dependability are rapidly making cellular-based digital signage the



## Chapter 3 Cellular-based digital signage in the real world

preferred choice of banks and credit unions.

In financial institutions, cellular-based digital signage can:

- Reinforce the brand identity of the financial institution.
- Increase the FI's services revenue through high-impact promotions.
- Reduce perceived wait times with entertaining or informational content.
- Reduce printing, delivery costs and waste from posters and flyers.
- Run messages that are unique to specific branches or regions.
- Centralize control of all digital marketing content, with localized options.

With these advantages, bank branches equipped with cellular-based digital signage build customer loyalty. Should a merger occur, the signage can be used to keep customers informed and train staff on what the merger means to them. By deploying a cellular-based digital signage network, the FI can reinforce its brand while reassuring, educating and informing consumers — and reducing costs.

### Corporate communications

Often deployers think of cellular-based digital signage as a means of selling or communicating with customers. But it is also a critical channel through which

a company can reach its employees and influence its workforce. It can be used as a call to action, a means of distributing information and an emergency notification system, among other uses. That's especially important for employees who do not use computers in their work and therefore have no access to the company's intranet.



The advantages of cellular-based digital signage for corporate communications include:

- Speed of deployment and setup
- Portability for remote locations
- The ability to quickly communicate corporate policy changes
- Informing employees of a new product launch
- Providing a platform for highly visible messages and videos
- The ability to stimulate word of mouth among employees

*Digital signage isn't just for marketing. Rolls-Royce uses it to communicate corporate messaging to employees on the shop floor.*

## Chapter 3 Cellular-based digital signage in the real world

- Providing a medium to communicate quickly and efficiently
- The ability to be easily deployable in lobbies, break rooms and other high-traffic public or private areas
- Reaching employees who are away from their PCs
- Delivering time-sensitive information while informing, educating and entertaining viewers
- Reducing printing and delivery costs as well as paper waste from posters and flyers

### Community narrowcasting

Cellular-based digital signage also is being used to reach specific communities. By narrowcasting, signage deployers are broadcasting specific, targeted information to individual neighborhoods and subdivisions. Owned and operated by a growing number of entrepreneurs, these television-like networks feature advertisements and news items that are important to the community. Local businesses can be featured, and local concerns can be addressed.

It's also a means of reaching consumers who use TiVo and other digital tools to block traditional television ads; only cellular-based signage networks provide the flexibility to make it happen.

Whether developing a cross-country specialty network or a cross-town

community advertising network, using cellular-based digital signage makes sense; it enables deployers to target and reach an audience with valuable time-to-market metrics and faster program ROI. It's an ideal solution for the new generation of out of home, or OOH, advertising networks.

Here are some of the advantages of deploying and operating a cellular-based digital signage network for community narrowcasting:

- The opportunity: In a high-growth industry, many markets remain untapped.
- Low cost: Infrastructure (i.e., cell towers) is already paid for and in place.
- Quick deployment means a faster return with a monthly advertising revenue stream.



*Cellular-based digital signage is a natural fit for the growing number of community-based and specialty narrowcasters that deploy in locations that are independently owned and operated.*



## Chapter 3 Cellular-based digital signage in the real world

- It can be deployed virtually anywhere; cellular displays only require power.
- All digital signs can be managed remotely over the Internet using a Web browser.

### Convenience stores and service stations

Cellular-based digital signage systems have demonstrated that they can significantly increase sales in retail environments, and gas stations and convenience stores are no exception. One way to increase product and service sales is by using signage to command consumer attention at the pump and drive buyers into the store.

The value for convenience stores, gas stations and fuel pumps include:

- The power to advertise directly at the pump to generate more in-store traffic
- Increase in sales with in-store displays promoting products
- The ability to influence customers to “impulse buy” at the point of decision
- The ability to remotely train sales and support staff via signage during off-hours
- Managing all digital signs remotely over the Internet, creating and scheduling playlists for specific market demographics
- Enhanced security

Unlike most retail store locations, gas stations and convenience stores typically have limited network access and bandwidth for anything other than their credit-card and register-based transactions. With a cellular network, no additional infrastructure needs to be added or maintained across hundreds or even thousands of locations.

### Billboards

Traditional print media is dying, as are the days when static posters and tattered newspaper ads could catch the consumer’s eye. Dynamic graphics and full-motion video are the wave of the future.

With that in mind, it’s not surprising that conventional billboards are being replaced with billboards containing digital signage. There’s just one problem: Where do you find a network connection? It’s not very easy to run an Ethernet cable across the interstate to get to that billboard. The infrastructure required for a DSL drop, Wi-Fi connection or satellite linkup isn’t exactly conducive for a billboard either.

Once again, cellular networks come into play. As long as a billboard is within reach of a cell tower, communication is a cinch.

# Chapter 4 What are cellular networks?

“We’re all pretty familiar with cellular technology when it comes to cell phones,” said Keith Kelsen, executive chairman for MediaTile. “What most people don’t realize is that those same cell towers are now providing many consumers with Internet access as well. That service is called cellular broadband, and it’s revolutionizing the way digital signage networks can communicate. No more cables! No more hubs! No more on-site infrastructure, period.”

All major U.S. carriers, including Verizon Wireless, Sprint, T-Mobile and AT&T, now offer cellular broadband services. Internationally, those services are available through carriers such as Vodacom, Vodafone, B-Mobile and Bell-Mobility, to name a few.

“People are still using Ethernet and Wi-Fi networks,” Kelsen said. “The cost of cellular has come down. Price is no longer a factor — it’s practically the same as the old networks if you add up all the true costs of ownership, including the going costs for replacement gear, IT support and maintenance. The technology is changing so fast that most companies out there don’t realize there’s a better option.”

Cellular broadband is rapidly changing the way digital signage networks are configured. Before deploying cellular signage, though, it may help to understand the available types of

cellular broadband networks, as well as the terminology.

## 1G, 2G, 3G and 4G

Most cellular broadband networks operate on what is called third-generation, or 3G, cellular technology. First-generation technology, referred to as 1G, was based on analog cell service. When cellular networks switched to digital service, enabling greater signal compression and increased activity on the networks, the term 2G was coined.

**“The cost of cellular has come down. Price is no longer a factor — it’s practically the same as the old networks if you add up all the true costs of ownership, including the going costs for replacement gear, IT support and maintenance. The technology is changing so fast that most companies out there don’t realize there’s a better option.”**

**— Keith Kelsen, executive chairman for MediaTile**

Today, 3G and 4G networks combine wireless telephone and data services to provide a variety of applications to cell phone users, such as voice communication, Internet access and the ability to download multimedia files.

## Chapter 4 What are cellular networks?

“With Sprint Mobile Broadband, our customers are able to send and receive information and access high-speed data applications at broadband speeds using handheld devices and connection cards, anywhere on our nationwide mobile broadband network,” said Dennis McSweeney, area vice president for Reston, Va.-based Sprint Nextel.

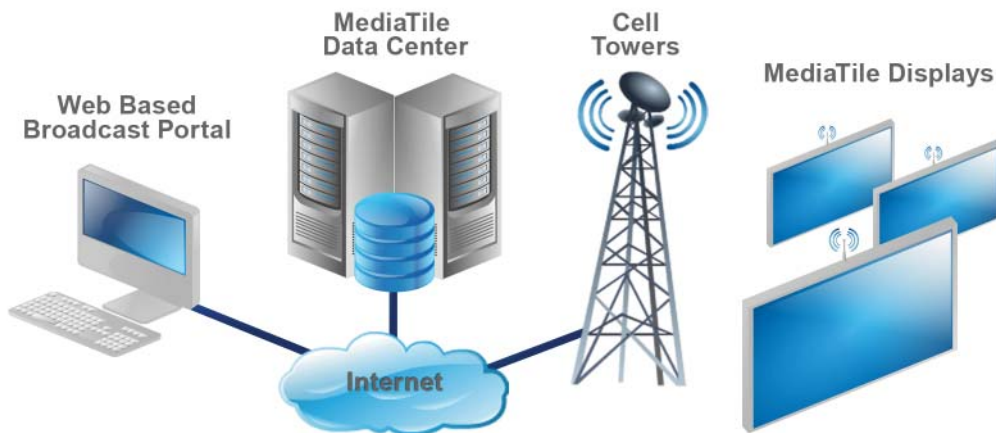
“Our data revenue is being propelled by an increasing share of EVDO direct customers and business partners, creating strong demand for this new generation of flexible broadband service. The vast majority of the Sprint Mobile Broadband Network has been upgraded to EV-DO Rev. A technology, which supports faster data rates and enables users to send and receive information at broadband speeds,” he added.



*MediaTile Digital Sign in a Box is a 32-inch, all-in-one cellular-based digital signage solution.*

### Global System for Mobile communications, or GSM

GSM is the most widely used mobile phone standard in the world, and the demand for GSM is rising. According to 3G.co.uk, roughly half of the world’s six billion people are GSM subscribers. Informa Telecoms and Media, a research firm that covers the digital communications industry, reported that



*The journey of digital content begins at the computer terminal and ends at the digital display.*

## Chapter 4 What are cellular networks?



*Digital displays have a way of catching the eyes of people passing by.*

88 percent of the 3.5 billion subscribers of mobile communications technology utilize GSM networks.

The GSM subscriber base is expected to grow, with most of the expansion occurring in high-growth markets where users are increasingly price-conscious. Growth is primarily being driven by new network deployments and capacity expansions in high-growth markets such as Asia and Africa, while more than 10 million new subscribers are being added every month across China and India.

GSM is characterized by its support of high-quality audible voice communication at a relatively low

cost. It is based on digital technology, which makes it primarily a 2G system, but it often is combined with data technologies that make it comparable to a 3G system.

GSM networks, for the most part, operate in the 900-MHz or 1800-MHz frequency bands, although Canada and the United States use the 850-MHz and 1900-MHz frequency bands, and a handful of countries utilize the 400-MHz and 450-MHz bands.

### **Code Division Multiple Access, or CDMA**

CDMA is a 2G and 3G wireless communications protocol that competes



## Chapter 4 What are cellular networks?

with GSM. Operating in the 800-MHz and 1.9-GHz bands, CDMA makes it possible for several signals to operate within a single transmission channel — a technique commonly referred to as “multiplexing.” This technique makes it less likely for the cellular network to experience overload.

It works like this: Phone and data conversations are sent over the same frequency. CDMA distributes these conversations across the frequency grouped in bits that are all together. To protect the integrity of the conversations and keep them from getting mixed up, CDMA tags all bits belonging to a particular conversation with a unique code. When it’s time for the conversation to reach its intended recipient, CDMA uses the code to pick out the necessary bits and reassemble the voice or data pattern so the recipient can interpret the communication.

### Evolution-Data Optimized, or EVDO

EVDO is a 3G communications protocol that deals solely with the transmission of data through radio signals. This technology is of primary concern to digital signage deployers because it’s what makes cellular networks possible.

Before the emergence of EVDO technology, wireless access to the Internet was limited. For the most part, laptop users were confined to so-called

“hotspots” — wireless networks with a limited range — if they wanted to access the Internet.

EVDO changed that. An EVDO-based network card allows users to utilize cellular communications to get online. Users can access the Web from their laptops regardless of their location, providing they’re within range of a cellular network. EVDO typically provides online access at speeds comparable to DSL.



Verizon Wireless and Sprint PCS are among the U.S. cellular service providers that offer EVDO-based broadband Internet services.

### The cellular roadmap

EVDO technology means signage can have unlimited access to an online network via cellular communication — and not just any access, but access

*A lounge is a great location for digital signage, as it ensures a captive audience.*

## Chapter 4 What are cellular networks?



*One advantage of digital signage is the high-definition image it conveys in bright, vibrant colors.*

at DSL and faster-than-DSL speeds. That increased speed and performance makes it possible to integrate digital signage on cellular networks.

“Utilizing cellular communications for digital signage had largely escaped the cellular industry due to technology and coverage requirements,” said Michael Voellinger, vice president of mobility at Telwares Communications, LLC. “The positive attributes in terms of today’s market are the increasing bandwidth numbers and the pervasive nature of the coverage footprint. This will ease implementation and deployment cycles, which will naturally impact pricing and availability to digital signage.”

And the best part is that a simple EVDO-enabled network card replaces hubs, servers, routers and cables.

Alex Brisbane, president and COO of KORE Telematics, summarized the benefits that cellular communication brings to digital signage. “Accessibility, no landline needs, low variable cost, the ability to quickly and efficiently update signs using multicast and the ability to link with the location for movable signs” are all advantages, he said. “In terms of drawbacks, there are none, except for a small, repeatable service cost.”

It’s network communication like never before.

# Chapter 5

## The cast of carriers

Once a deployer decides to integrate signage into a cellular network, it's time to look at cellular carriers. Nearly all cellular service providers support the digital signage industry.

The deployer should consider three main factors when evaluating digital signage solutions based on cellular networks:

- **Coverage area:** What is the extent of the provider's coverage area? It should reach every location where the deployer plans to place a digital display. The deployer should always ask to see a map outlining the extent of the service provider's coverage area. Even better, the deployer can ask to borrow a demo network card to try out the provider's services and make sure the coverage area is suitable. As an alternative, the deployer's digital signage provider can do this on behalf of the client.
- **Capabilities:** Can the network provide the necessary tools? What sort of communications protocol is used? GSM? TDMA? CDMA? How close is the provider to implementing 4G protocols such as WiMax? How quickly can content be transmitted over the network? These are critical questions to ask before signing on the dotted line.

- **Contract:** The contract will determine the services the deployer receives as well as the cost of those services. Is the agreement for one year or two years? Many contracts stipulate a sizable fee for early termination. Reading the fine print may save a deployer a lot of money and prevent headaches down the road.

**The deployer should consider three main factors when evaluating digital signage solutions based on cellular networks.**

To ensure the success of the digital signage network, a deployer needs to select the best cellular provider for the company's needs. Below is a list of some of the most widely used carriers, both in the United States and internationally. This is by no means a complete list, but it may help in the search.

- **Verizon Communications, Inc.:** Based in New York, Verizon was formed in 2000 when Bell Atlantic merged with General Telephone and Electronics (GTE). It services the United States and recently acquired MCI, Inc., another telecommunications company. Verizon uses CDMA technology and is developing 4G/WiMax capability.



## Chapter 5 The cast of carriers

- **Sprint Nextel Corporation:** A major cellular provider in the United States and a leader in the business-to-business market is the Sprint Nextel Corporation, which was formed in 2005 when the Sprint Corporation purchased Nextel Communications — a company widely recognized for providing cell phones that doubled as two-way radios. Sprint networks operate by using the PCS protocol; the company is moving toward 4G/WiMax capability.
- **Vodafone Group PLC:** Based in the United Kingdom, Vodafone has customers in other countries as well, including Germany, India, Italy, Spain, Turkey, Egypt and the United States (through a minority stake in Verizon). Vodafone uses a GSM/EDGE protocol and has plans to share a 4G network with Verizon.
- **B-Mobile Communications Sdn. Bhd:** Founded in 2005, B-Mobile is a relatively new player on the cellular stage. Located in Brunei, it services the Caribbean. B-Mobile, which was formed as a joint venture between Telekom Brunei Berhad and QAF Comserve, uses GSM protocols.
- **Bell Mobility:** Bell Mobility is a division of Bell Canada Enterprises, Inc. — a 127-year-old company and the largest communications provider in Canada. In July 2006, Bell Mobility assumed responsibility

for Aliant Mobility as part of a restructuring and continues to do business in Atlantic Canada under the Aliant Mobility name. Bell Mobility uses the CDMA protocol.

- **Vodacom (Pty) Ltd.:** Vodacom has more than 23 million customers in South Africa, Tanzania, Lesotho, Mozambique and the Democratic Republic of the Congo. It was the first carrier to deploy a 3G network in South Africa and operates under the GSM protocol.

**To ensure the success of the digital signage network, a deployer needs to select the best cellular provider for the company's needs.**

- **Taiwan Mobile Co., Ltd.:** One of the top three operators of mobile communications in Taiwan, the company recently announced plans to invest up to \$5.3 million to purchase Hurray! Times Communications, Beijing — a communications company based in China — despite the historically uneasy relationship between Taiwan and China. Taiwan Mobile uses a GSM network.
- **Movistar:** Movistar is owned by Telefónica Móviles and provides cellular services to Spain and several Latin American countries. With 22 million cell phone customers, it is the largest carrier in

## Chapter 5 The cast of carriers

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Spain and has the largest coverage area. Movistar uses a GSM network.

- **Telenor:** Based in Norway, Telenor provides cellular services to Scandinavia, Eastern Europe and Asia. According to its Web site, the company handles more than 129 million mobile subscriptions worldwide. Telenor's network operates primarily under GSM technology, although some of Telenor's business units use CDMA.

### The top 10 digital signage trends for 2009

By Keith Kelsen

*This story was originally published Jan. 6, 2009 on DigitalSignageToday.com.*

#### **Trend #1: Content is the next main talking point for the industry**

This will be a pivotal year for great content. As an industry, we now have great, proven technology to deliver messages across DOOH networks, so now what? Dare I say it? I have to! "Content is king." Why?

Since prehistoric times, as evidenced in cave paintings, people have used images, placed where others would encounter them, to communicate important information. For more than 120 years, rapid advances in technology have transformed human communication, delivering information faster and to a greater degree of relevance.

The technology that has led us to a new medium, digital signage, has become commonplace. Now, more than ever before, "the message is the medium." The content running across screens provides digital signage its moment to shine. As a new medium, digital signage needs to define its own creative approach to content.

#### **Trend #2: Traditional broadcasters are getting into the digital signage marketplace**

With the television industry facing an unprecedented downturn, manufacturers and producers of content are looking to expand and capitalize on the DOOH/digital signage industry. It is the natural evolution as a new media develops that many companies put resources into testing the market. Some jump in with both feet as they have no other alternative.

Production houses employ expert creative teams that can bring top-quality content into the world of digital signage. Some will have to play catch-up; some will leverage Web and flash skills to optimize great content for this new medium, for maximum impact and to achieve unprecedented returns. We will likely see acquisitions coming from the TV broadcasting industry, companies essentially buying their way into the market to make up for lost time in the DOOH industry, around technology and production.

#### **Trend #3: Agencies are awaking to the power of digital signage**

Many agencies are realizing that DOOH is a valuable area to explore. It is a difficult transition from traditional media to DOOH. Some agencies are prompting brands to buy into this burgeoning market. Open software platforms for the DOOH market will

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excel as they allow cross network placement, helping agencies drive more comfort and scale widely across the digital signage landscape.

Agencies are also realizing that DOOH includes more than digital billboards, that it extends beyond this early digital signage incarnation. DOOH is being used to build brand networks at the shelf and in-store, to capture the consumer at the best possible time: at the point of decision.

In-store media is the new frontier for agencies looking to expand product presence and increase sales at the shelf. The good news is that the media is measurable with real sales-lift as proof. In-store media is more than just capturing “eyeballs” and branding; it is about the merchandising and selling of product — not to mention the resultant tremendous in-store associate training benefits gained at the same time.

### **Trend #4: Brands are shifting money to this market from traditional TV**

Major brands are moving into the market, right now. Once traditional TV viewership declined, they began looking for more effective messaging. This trend began last year when a few brands bypassed their agencies and began experimenting directly with DOOH.

Building brand networks in-store at the shelf is a critical part of this

strategy. For brands to survive and retain customers, they must spend money at the point of sale or risk losing customers to generic brands. Once lost, a customer is tough to win back — and expensive. This trend will grow geometrically as sales become hotly contested.

### **Trend #5: Cross-platform and interaction with cell phones is critical**

In the past year, Bluetooth and text messaging integration passed its experimental and pilot phases. The connection and symbiotic relationship between display and cell phone will continue to grow with more deployments in 2009. Consumers are ready to utilize this technology today.

Personalizing features by offering coupons and other media on handsets will further drive sales at the shelf. Tracking these interactions to measure the success of a network will also play a part in the overall success of the campaign. Digital signage will take a front seat in this area, adding value to the entire digital communications grid.

### **Trend #6: Interactivity and measurement**

Along with interaction with cell phones, interactive technologies will propel the industry to enhance new consumer experiences, from touchscreens to floor screens and from window touchscreens

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to gesture-enabled interaction. The engagement of the consumer adds tactile to visual and helps to create an emotional connection with the brand and product. As was the case with cell phones, 2009 will see more than simple small pilot projects; it will boast large-scale rollouts vying for consumer's attention, ramped up to unprecedented levels.

Measurement proves the maturity of the industry and is key in 2009. Data collected from interactive solutions and delivered upstream will give DOOH another powerful asset in the form of market intelligence and direct consumer feedback for marketers and agencies to measure the success of their campaigns.

### **Trend #7: Data-driven content or ad search for DOOH**

As an increasing number of large networks emerge online, and the number of displays grows geometrically, creation of individual playlists that are relevant to a specific display and associated audience will become a thing of the past. Just as with Internet search engines, metadata for content and screens will ultimately be matched for the right time, place, target and behavioral attitudes. This will allow access to databases that have ad content and remove the complexities from decision-making focused upon "when," "where" and "why." This will

establish the industry as leading-edge, not trailing-edge.

### **Trend #8: Cost of LCD and players is entering next phase of cost down**

LCD screens are declining in price and have been for the past six years, a trend that will continue. Innovations on the media player side will also bring pricing down. Quality is still a significant factor and will be critical in keeping networks up and operational 24/7. Declining cost is not a substitute for reliable and scalable technology. Total investment and ROI still require a quality platform.

### **Trend #9: Consolidation and failures will continue**

In these unprecedented economic conditions, there will be failures and consolidations in 2009. This is both good for the industry and bad. Though we may see failures undermining the integrity of the industry, the pieces will be picked up and business models changed to improve the industry overall in 2009; the prevailing economic situation will simply accelerate this evolutionary process. There will be success for companies that are established, have good business models and have the cash flow to endure. 2010 will be the year of winners in the end game, where a few companies dominate the market.



### **Trend #10: Growth for the industry is moderate, but positive**

Notwithstanding my previous comments, industry growth will be moderate. Digital signage networks have the opportunity to reduce costs, save resources and communicate powerful messages. These are attributes that will spur continued growth as companies worldwide re-evaluate every element of their communication plans. Looking closely at the models and businesses that benefit by taking advantage of digital signage technology will be the key. Making the case to use digital signage is our job as an industry, and this will be yet another year of growth.

*Keith Kelsen is executive chairman of the board of MediaTile and chair of the Content Committee for the Digital Signage Association.*

## Cellular and digital signage integration

By Lyle Bunn

*This story was originally published Sept. 15, 2008 on DigitalSignageToday.com.*

**T**he word concomitance means “co-existing” or “effecting while simultaneously effected by.” As such, the word is an apt descriptor for the expanding relationship between digital signage and cellular technology.

The positioning of out-of-home digital signage has this concomitance generating keen interest, indicated by the planning and spending of ad agencies, brand managers, network operators and wireless carriers.

With 1 billion mobile devices being shipped annually, they constitute the largest segment of the consumer electronics device market, said Stuart Carlaw, VP and research director of ABI Research. That means cellular and other wireless merits consideration by the digital signage industry.

The benefits of triggering a download or mobile transaction provide brands with the high levels of engagement that accelerate brand-building. Communicators are catching onto this fast.

## Mobile: the future of advertising

Jupiter Research reported the North American mobile commerce revenue in 2007 to be \$505 million and forecast it to grow to \$1.9 billion in 2010. This is fueled by increased adoption of mobile Internet.

Comscore TKG projected growth to 92 million users in 2012 from 32 million in 2007, with highest usage, at 45 percent, being the Millennials demographic of hard-to-reach 18- to 24-year-olds. The next group, 27- to 40-year-old Gen X-ers, represents 27 percent of users, and 41- to 50-year-old Baby Boomers represent 17 percent.

The IBM Institute for Business Value Analysis reported that the highest compound annual growth rates, or CAGR, for global advertising spending are being realized in mobile advertising at 41 percent, followed by 20 percent for Internet and 19 percent for each of interactive TV and in-game advertising.

Wireless carriers are taking note of the high value that they can bring to digital signage while it simultaneously returns the favor. Concomitance of the two media means a co-existing “win” for every part of the supply chain, from network suppliers to operators to advertisers to viewers.

“Cellular and mobile broadband use for media networks leverages the network reach, reliability and security built into networks, like the nationwide

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Sprint network, that successfully carry millions of digital transmissions daily,” said Steve Rowley, director of indirect distribution for Sprint. “Digital signage will increasingly take advantage of what cellular offers.”

Walsh Wireless, a Sprint reseller, is one provider that is looking specifically at optimizing and using cellular technology to enhance digital signage.

“End users of digital signage want to focus on their core business of retail, hospitality or services, and benefit from the ease and confidence that gaining a complete, turnkey display network can provide,” said Chick Walsh, chief strategy officer of Walsh Wireless.

### Three benefits of cellular/digital signage concomitance

There are three benefits for carriers seeking more average revenue per user, or ARPU, from digital signage-cellular integration.

**1. Taking advantage of cellular networks:** The first key benefit is using cellular networks to connect digital signs. Using cellular connectivity offers speed and ease to deploy, location flexibility and a lower cost of operating a network.

Companies such as MediaTile, Adshift and NEC are providing cellular-enabled “digital-signage-in-a-box” products, and system integrators such as Walsh Wireless are bringing the two technologies together.

“The use of cellular connectivity for digital signage underpins the rapid path toward more flexible deployment and lower costs of operations,” said Keith Kelsen, CEO of MediaTile.

**2. Using screens for a mobile call to action:** A second benefit is found in mobile phone downloads that can be triggered by digital signage content. The words “text to download” provide viewer engagement and dramatically extend the value of digital signage.

The download could be a schedule, procedure, information, coupon, wallpaper or ringtone. Reference has been made to digital signage being a “middle media” that explains this communications supply-chain positioning of digital signage.

**3. Digital signage as a mobile merchandising tool:** The third benefit is in the mobile Internet browsing sessions and mobile transactions that can be triggered by digital signage.

Opinion Research Corp. said that one out of three U.S. mobile users is currently accessing the Web with mobiles, and 50 percent of those people are doing so three or more times per week.

Hossein Mousavi, EVP and co-founder of mporia, an m-commerce provider, reports that merchants of all sizes are moving to the mobile Web to enable

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mobile commerce, with a 300 percent adoption rate of merchant subscriptions per quarter.

Communications supply chains are a continuously growing and optimizing entity. As digital signage is increasingly geared toward information provisioning, cellular and other forms of wireless, such as Wi-Fi, Bluetooth, WiMax and satellite, will optimize the application while reducing deployment and operating complexity and cost. Cellular will both offer and enjoy benefits — “concomitance.”

## Digital signage connectivity

By Christopher Hall

*This story was originally published July 14, 2008 on DigitalSignageToday.com.*

**R**olling out a new digital signage network or system can be similar to playing a high-tech, high-stakes game of connect the dots. With content ready and a good idea of what displays to use, the primary question then becomes: How do you connect them?

With a wide variety of possibilities encompassing a range of cabled, wireless or cellular options for transmitting video from player to display, the answer may well be that it largely depends on what the deployer is looking for in its digital signage network.

For some resellers or signage operators, using a cabled approach may make more sense; for others, wireless or cellular or Wi-Fi might work better.

“You’re going to want to use whatever is applicable to your display, whatever connection you have on your display and also to whatever your source is as well,” said Dave Gebhart, a technical sales representative with Cables to Go, a Dayton, Ohio-based company offering a variety of solutions within the cabled set.

“In the simplest sense, you basically have to have some sort of content that’s created on some sort of player that’s ready to output,” said Matt Nelson, director of marketing at Avocent, a provider of wireless digital signage products. “That’s the first step, and then beyond that you need to figure out how many displays you want to have, whether it is a one-to-one or a one-to-many.”

### Going wireless

For transmitting content over wireless connections, Avocent’s concentration increasingly involves having a set of centralized players shooting out signals to dispersed transmitters at the location of the screens, which then relay the content to receivers on the screens themselves, which makes handling content easier, Nelson said.

The two major advantages to Avocent’s wireless system that resellers or signage installers would likely be interested in are its speed of deployment and ease of manageability, Nelson said.

With what he called “a land rush” ongoing in trying to quickly deploy digital signage networks everywhere from malls to groceries to airports to doctor’s offices, speed of deployment can be a critical concern.

“With a wireless system you can deploy a wireless digital signage



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system with multiple displays in a matter of hours, versus days or weeks if you were to wire it,” he said. “You basically can pre-stage a media player and all your displays with a wireless system in your office and then walk out and plop into a person’s store.”

That means minimal disruption to the business where the signage is going in, he said, and it also means that operators can set up multiple networks per week as opposed to maybe one a week.

“When you’re trying to roll out 1,500 displays across 30 metropolitan areas, wireless is really the way to go,” Nelson said.

Avocent’s wireless systems also increase the manageability of the system, not just of the transmitters and receivers but also the devices attached, he said. Avocent’s transmitters and receivers are IP addressable, meaning there’s a Web page operators can get onto to get into the system and work on it, from changing the radio frequency it’s running on to rebooting a single display, from just about anywhere.

“I can even change brightness and contrast on an individual display from sitting at my desk,” Nelson said.

The benefit to that is preventing truck rolls for service calls, “which saves a huge amount of cost,” he said. “If someone calls up with a problem

with the display on a pump at a filling station, and you can pull up the status and reset the display, nine times out of 10 that can prevent having to make a service call. Enterprise management is built into the system.”

Wireless systems will work with VGA, DVI or HDMI, Nelson said, because it automatically detects what is going into the transmitter and auto-detects the receivers, supporting up to eight receivers per transmitter with little or no configuration. Multiple transmitters and receivers do call for more configuration work.

### Differentiating between cable types

For cable applications, there are again a number of possible routes for signage operators, including HDMI (High-Definition Multimedia Interface), component, and composite video cables, Gebhart said.

HDMI cable carries audio and video, with purely digital picture and 1080p and 1080i resolution, he said.

While it runs an analog signal, component video cable is also capable of hi-def quality picture, Gebhart said. Component video cable carries video consisting of three signals, one controlling luminance, or brightness, and two color difference signals that dictate the amount of color relative to luminance.

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Composite video cable, Gebhart said, is basically the same kind of cable you'd find on the back of your DVD player or VCR, hooking it into your television. Composite video cable carries a composite video signal that is those three signals compressed into one signal. The composite signal then needs to be decompressed and restored to three-signal format inside the receiver, resulting in lost picture information and therefore reduced picture crispness and color richness.

"Figure out what it is that you want to show; figure out how many displays you want to connect to," Gebhart said. "Then determine your source and select the appropriate cables for the application."

### Digital signage on cell phone networks

Keith Kelsen, CEO of Silicon Valley-based MediaTile, said you have to look at the total cost of ownership involved in operating a digital signage network, even when thinking about connectivity. To him, that means picking cellular, using a pre-existing network maintained by someone else, and not bothering your IT department too much.

"Our position is why burden the IT department when you already have a network available? On our networks worldwide, we have probably 45,000 people working on our network every day," he said.

That's because those networks are already extant cellular networks run by companies like Verizon, Vodaphone, AT&T and Sprint, he said.

"Basically when you look at cellular digital signage, and you look at connectivity, you already have an existing network that is very robust and very reliable, and it already exists — everywhere," he said.

It is a little more complicated than that, since MediaTile equipment does other things to make certain the connection is made, such as amplification of signal, but it really is just about as simple as plug it in and play, Kelsen said.

There is also a safety factor to consider, he said, since using cellular digital signage means operating on a completely different network than the one that may carry mission-critical data, thus not compromising the transfer of either information.

The benefits of cellular digital signage can be seen in lowered costs of the overall cost of the network, Kelsen said. There's no infrastructure work or maintenance costs involved; there's little to no need to learn a new technology, because that's been made a non-factor before you start, he said. And it lets business operators get back to the business of business.

"If I'm a retailer, I'm really in the business of selling things. I don't want to get all tied up in the technology

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side of it. What happens is it basically becomes a big burden,” Kelsen said.

And the most obvious way they do that, he said, is by making its plug-and-play system truly plug-and-play.

“With cellular digital signage it’s as easy as plugging into the wall. I literally plug it in, and it’s ready to go,” Kelsen said.