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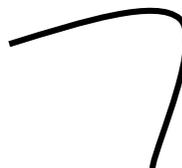
IS 2004-34

**Electronic Signage Networks (ESN) as
Killer App**



APOGEE PARTNERS

apogee \AP-uh-jee\, noun:
The farthest or highest point; culmination.



July 2004

Electronic Signage Networks (ESN) as “Killer App”: White paper

Summary: Electronic Signage Networks (ESN) are poised to follow Word Processing, VisiCalc, bar codes, Enterprise Resource Planning and e-mail, in becoming the next “Killer App”, a technology application that finds its place in usage quickly and broadly, because of its enabling value and money-making potential. The price and performance of each needed component of ESN (i.e. LED, LCD, Plasma display, telecom, servers, etc) continuously improves, and a key enabling element needed to control image display in a secure, flexible, audit-able way is the now available. The ESN software control system is called “Dynamic Image Provisioning Applications (DIPA)”. Hardware, software and communications components can be assembled to create Electronic Signage Networks able to display compelling images or provide information at the specific location and time useful to achieving product selection, public safety or other objectives. ESNs compel product selection, powerfully augment Emergency Broadcast systems, can respond to RFID (radio frequency identification), biometric, hazardous materials and other triggers, all in a way that gets the attention of the intended audience. “Killer Apps (applications)” are defined as technologies that move productivity to a newly imaginable plateau for businesses, government and people through electronic devices and software. This whitepaper describes Electronic Signage Networks are the next “Killer App.”

Table of Contents

A. Killer Applications	Definition Need and Evolution Economic Impact
B. Electronic Signage Networks (ESN)	ESN Makes Money Technology Integration Applications Dual-Use Growth Projections
C. Dynamic Image Provision Applications (DIPA)	Back Office control Overrides Image Triggering
D. Key Trends and Outlook	Deployment pace 9/11 Commission Dual Use Systems Integration Interoperability Deployment Budgeting

A. Killer Applications

New Tools and Better Approaches

“Killer Apps (applications)” are defined as technologies that move productivity to a newly imaginable plateau for businesses, government and people. “Killer Apps” have typically involved dramatic cost reductions through time savings in creating, storing and communicating words and numbers. Increased processing, storage and bandwidth capabilities have enabled still and motion images to emerge as a core presentation of data and communications medium. The ability to see data and images “as you need it, where you need it and when you need it” underpins the growth of laptop, PDA (Personal Digital Assistant), messaging devices, cellular, internet, datacast and many other markets. ESN represents the next plateau of digital communications.

Need and Evolution

New Revenues

“Killer Apps” such as Word Processing, VisiCalc (which spawned Lotus 1-2-3 and Excel), Bar Coding (which is spawning RFID (Radio Frequency Identification) and ePC (electronic product codes), Electronic Mail and other technologies that combine electronic hardware devices and software, cause and result in economic change. Significant revenues and market positioning is available to firms in the supply chain of such technologies, while at the same time, better market positioning, operational savings and organizational improvements are afforded those who use the technology.

Cost Structures Change

Changing cost structures, improving communications and generating new revenue opportunities have defined the emergence of the information technology and telecommunications sectors within this generation as the engine of global economic, social and national development. These three elements will continue to drive the uptake of technology and therewith, technology development.

“Killer Apps” change cost structures and creating new revenue opportunities proportionate to their enabling effect.

Economic Impact

“Killer Apps” energize an economy and in other now-predictable ways; (consider e-mail as a killer app in considering the magnitude of these changes and economic impacts). In particular;

- New, different and higher value-added jobs are created.
- Increased scale of production results in the commoditization of manufactured elements. This is reflected as an exponential revenue growth curve and a stabilized, predictable profit curve during broad adoption of the innovation;
- Software-related revenue and profit growth increase during adoption and use;
- Service related organizations emerge and grow related to installing, sustaining, providing, training and usability of the application.

New Jobs

A new area of significant, beneficial economic impact is available in the rapid growth of image communications. Significant new revenues are available through the creation of images. Electronic signage offers new opportunities to communicate features, benefits and information, while motivating consumer selection that can support improved communications.

Ad Sector Growth

Local markets offer local image creation opportunities, inspiring local economic development and service supply to others. Image creation and display revenues continue to grow after an initial capital outlay for installation of the signage network.

B. Electronic Signage Networks (ESN)

Leveraging Available, Existing Technologies

An electronic Signage Network is comprised of multiple electronic displays (such as LED, LCD, Plasma, CRT, etc) which display images and text that is transported to the device using data communications (such as wire, wireless, WiFi, satellite, Internet, etc) from a storage device, all of which are controlled by software which schedules, formats, transports and audits the display. The unique feature of an Electronic Signage Network is in displaying multiple, compelling images of television quality or much sharper at the place and time when a decision is needed, made or

motivated. The core benefit is that the message is noted, compels an intended decision and does so in a cost-effective and brand-building manner.

ESN's can be several displays in a retail location to hundreds of displays within a commercial, campus, stadium or government complex, to several thousand displays across a transit system, city, retail chain or nation. Many ESN of 10-100 displays have and are being implemented as are a number of ESN comprised of several thousand displays.

ESN Makes Money

New Revenues are generated for all Parties Involved

Electronic Signage Networks satisfy a commercial imperative; they make money. Revenues and profit are generated for the organizations that choose to display on the devices, for all parties in hardware, telecom and software supply for the ESN, for the firms that create, sell or place ads and other display materials, for those who finance the elements of the networks and for those who own or manage the locations of each display.

ESN moneymaking potential is the greatest argument for proceeding with ESN deployments, in particular for location "owners". Property managers, city officials and transit authorities are particularly inclined toward championing ESN installation for the revenue that could be enjoyed through these displays. That they can improve the safety of people on premises is an added bonus in these cases.

Technology Integration

ESN leverages and exploits a range of proven enabling technologies and infrastructure, as well as existing or planned images and information. Enabled primarily by electronic display and communications advances, ESNs offer the powerful impact of animated and motion images with flexibility to present more images in more formats at a particular location.

The Missing Ingredient: DIPA Now Ties It All Together

Elements of the ESN are tied together and controlled by a new class of software called "Dynamic Image Provisioning Applications (DIPA)". DIPA control software offers the missing ingredient to enabled available technology to be combined to be an Electronic Signage Network. While each technology has merit on its own, the combinations of display, connectivity and media management form a powerful tool for commerce and public safety. DIPA tools, such as that provided by Automated Digital Signage Networks, Inc. (www.adsn.ca), which will control several very large ESN being implemented, are designed for very large networks with very dynamic display, in a dual use (commerce and public safety) ESN.

Multiple Display Options

A wide range of electronic display can be used from CRT (computer screen), LED, LCD, Plasma, touch-less screens, etc. Displays are being made vandal-proof, ruggedized able to survive harsh conditions. Some new networks include circular LED (DynaScan USA) and, holographic 3D aerial imaging (McDonald's restaurants are using 3D from Provision Entertainment).

Multiple Communications Options

Digital communications methods ranging from telephone line to WiFi to satellite are applicable. The increasing capacity and proliferation of WiFi, including obstruction-penetrating WiFi enabled by multi-polarized antennas (WiFi-Plus, Inc.) allow lower installation costs and greater flexibility to move displays.

Triggers and "Sniffers"

Being digital also means that individual displays can be triggered by electronic identifiers such as RFID, ePC, proximity detectors, atmospheric "sniffers" (such as smoke, light, temperature, hazardous materials detectors) or biometrics such as facial recognition. Advanced Interfaces, Inc. has made particular progress in facial recognition biometrics.

ESNs are emerging as the next generation of broadcasting, narrowcasting and standalone signage. And improved display provisioning offers the opportunity for signage add-on to kiosk and self-service devices. The narrowing of the usage gap between kiosks being a private interaction and signage effectively attracting attention, improves kiosk/self-serve revenue potential.

System Integrators in Key Role

Firms that bring expertise in technology supply, integration and installation, along with an understanding of retailing, advertising, public information, etc. are invaluable in planning and implementing an ESN. By coordinating supply elements and working with organizations to plan

and implement the ESN, the critical issue of ESN success, that of technology integration is achieved. ESN Integrators such as In-Store Merchandising Solutions, Inc (Chicago) www.windowadvantages.com) and 2Bros Technologies, Inc. (California) offer the necessary experience, expertise and relationships for large ESN deployments.

Applications

The dynamic nature of electronic display allows a single display or group of displays to serve multiple purposes, even simultaneously.

Generally, these purposes fit within two categories, including Commercial and Public Safety. Commercial uses of electronic display include advertising, branding, product or service information, usage demonstrations, traffic building or retention, and point of decision influence.

Various studies point to the effectiveness of electronic display as a communications medium. Measures such as attention capture, recall rate and decision influence have proven significantly better than static signage.

Electronic displays get more attention, message recall and actions.

In a Las Vegas study of 400 mall visitors, researchers found 37 percent better recall from dynamic vs. static signs; caused 51 % more respondents to say they might visit one of the advertised businesses; and resulted in 103 % more people patronizing one or more of the stores or restaurants involved.

Public Safety uses of electronic display include warnings (weather, safety improvements, etc.), alerts (amber alerts, delays in schedules, presence of danger, etc.), public information (schedules, etc.), directives (exit, routing, detours, “what to do”, etc.), public education, news and infotainment. Surveillance devices such as camera, audio or infrared can feed directly into a staffed security or response center as already exists in many transit systems, retail locations, secure areas, etc. Warning and alert messages based on detection of a threat situation can be conveyed as a normal part of a security system.

While there is strong commercial motivation for ESN, these same displays can be used for public safety as needed.

In releasing the final report of the National Commission on Terrorist Attack upon the United States on July 22, 2004, Thomas H. Kean, Chair of the 9/11 Commission said “We expect future attacks.”

The 9/11 Commission report included recommendations to implement alerts and public direction mechanisms, and on page 415 of the report, further recommended that an organization’s use of this technology be considered in assessing insurability and creditworthiness. ESN offers immediate and straightforward action for public safety.

This action is also cost-effective in the case of dual-use ESN. Displays can serve both a commercial purpose and a public safety need.

Growth Projections

While few projections are published for ESN deployments or revenues, statistics related to narrowcast could be applied as ESN displaces this technology.

North American revenue growth projected is comprised as follows;

	2002	2006	% CAGR
Systems Integration	62	321	56.4
Advert. Net Operations	213	1204	48.9
Control/Mnmt Software	43	180	47.3
Display screens	70	221	45.4
Total (\$US million)	\$388	\$1,926	49.3

There are currently 900 firms in North America with 100 or more separate business locations for signage (i.e. retail and service outlets). These large chains will account for the majority of

revenue growth in the next 5 years.

By 2006 over 26,000 firms will use narrowcast systems, nearly 92,000 sites (i.e. locations or discreet premises) with at least one networked display, and in installed base of over 387,000 displays.

This 26,000 firms represents only 1.6% of the 1.6 million retail and service firms that have more than 1 business location that might implement narrowcast systems. This suggests a conservative projection and high growth potential for turnkey and all elements of narrowcast system beyond the 2006 projection horizon.

29% CAGR in retail signage market to \$2.35 billion in 2009

Isuppli/Stanford Resources reported that the worldwide retail signage market was \$501 million in 2003 with a growth projection is 29% CAGR to \$2.35 billion in 2009. 2003 display revenues were comprised of plasma at \$310 million with LED video at \$156, rear projection at \$19 and LCD at \$16 million.

By 2009 plasma displays are expected to generate \$1.14 billion in revenues, followed closely by LCDs at \$996 million. LED and rear projection are expected to be \$220 million and \$30 million respectively.

Dynamic Image Provisioning Applications (DIPA).

Dynamic Image Provision Application (DIPA), a new category of software now available provides full control of image and information presentation in an Electronic Signage Network (ESN).

Image display control

Back Office control

The following lists elements of the DIPA. Importantly, these accommodate display screen splitting which allows advertisers and information providers to reduce or spread their message display investment. Further these operational elements inherent in the DIPA must meet the “RAS-able” requirements inherent in a technology based system, specifically Reliable, Available and Scalable.

Display space splitting: more dynamic and higher ROI

Content Management Tools	Quality of Service (QoS) Assurance
Content Creation	Operations Monitoring
Content Ingest, Encoding and Translation	Proximity Content Display
Asset Management	Reliable Content Distribution/Transport
Content Storage and Backup	Network Monitoring (SNMP)
Operations Management Systems	Data Network
Screen splitting/configuration	Site Components
Display Scheduling	Cache/Edge Server
Content Trafficking/Transport	Local Network
Billing	Network Players
Logging	Displays
Play-out Audit	

The DIPA application also operates across a wide range of;

- Image and information file formats,
- Database formats and tools,
- File transport approaches (WiFi, internet, satellite, etc.),
- Media players
- Display products
- Interactivity formats and products (ePC, RFID, etc.)

Tools are required within the application that enable a) the arrangement and segmentation of display area for simultaneous presentation of multiple images b) in multiple electronic file formats and c) schedule these accounting for split screen, picture-in-picture and multi media layout.

Overrides

*Real-time
Message Override
is Essential.*

The ability to override display messages with an Amber alert, warning or public announcement is an inherently required characteristic if the ESN is to serve public safety needs. Neither stand-alone displays that play media from a storage medium (CD, DVD, etc), nor displays with widely spaced content download can serve this need.

Real-time or short-period message override can work in concert with triggers for smoke, heat, hazmat or other harmful agent detection to alert and direct people for safety.

Further, the ESN that aims for public safety improvement must inter-operate with emergency service organizations for premises monitoring and communications. The 9/11 Commission's recommendation for ANSI and Signal Corp standard urges this need.

Image Triggering

*Integrating ESN
with "Triggers"
for Greater
Benefit*

Back office control of the ESN through DIPA must include or scale to various input triggers.

For public safety these triggers might include atmospheric sensors, proximity indicators, progress markers, cameras and a real-time or controlled message override.

For commercial advantage and to accommodate advances in technology and business practices, these triggers might include proximity indication, radio frequency emission, biometric identification, low stock level indicators, etc.

D. Key Trends and Outlook

Various trends are suggested based on recent experience and activities in relation to the commercial and public value of ESN.

Deployment Pace

*ESN Deployments
will Accelerate*

ESN introduces a new revenue stream, an additional face of the enterprise either housing signage units or displaying on them and represents an outlay of capital and organizational resources to plan and implement. This assessment and planning takes time no doubt, and it has been proceeding. An acceleration of ESN deployments could be expected for the following reasons;

- ESNs make money for all parties involved.
- ESNs offer high value as a public safety communications tool.
- The dual-use of ESN (commerce and public safety) affords greater motivation to implement. ESNs offer an alternate or extension to narrowcasting systems that are good candidates or ready for re-fit or implementation.
- All technology elements are now available for successful, scalable ESN
- Wireless communications allows for easier placement and movement of ESN displays.
- ESN is being advanced or supported by some key decision-makers seeking non-core revenues (i.e. property managers, city officials, government departments, transit systems, etc).
- Public Safety officials and emergency response organizations are advancing ESN to support their objectives. The 9/11 Commission made specific recommendations in this regard.
- ESN is being "sold" by many contributors in the ESN supply chain (such as display, telecom and software providers, ad creation and placement agencies, ESN integrators, etc).

9/11 Commission

The National Commission on Terrorist Attack upon the United States (9/11 Commission) final report noted the critical importance of public alert and safety information (recommendation page 415), indicating the legitimacy of linking such communications to insurability and creditworthiness. In its stance for implementation of these recommendations, the following could reasonably be expected;

Leadership by Example while Protecting Public Institutions

- All buildings housing government operations (in which public sector employees work or which are open to visit by the American public) would be equipped with dynamic exit and alert signage able to provide accurate, timely, clear evacuation and safety instructions.
- Infrastructure receiving federal government funding, such as subway, bus and rail transit systems, airport, memorials, parks, highways, stadiums, attractions, etc., would be equipped with public safety signage.
- Credit and insurance underwriters will establish and implement measures to encourage improved safety of employees and patrons.
- Commercial and public organizations leveraging using ESN for public safety purposes will enjoy selection preference by government operations, reduced insurance rates and improved creditworthiness.

Dual Use

Leveraging Private and Public Investment

While multiple use might describe the way in which electronic signage will be used, “dual use” in a commercial and public safety context could be expected.

While workplace and patron safety messaging, as well as warnings and alerts serve to improve the quality of a visit experience, it is possible that commercial organizations (i.e. retailers, property managers, etc) might enjoy government funding based on information provided.

Measures that help reduce loss of life or injury can be expected to result in lower insurance costs.

Conversely, it could be expected that ESN primarily for public safety and information could generate revenue through commercial advertising.

Systems Integration

ESN Integrator Growth

Participants in the ESN supply chain include hardware, software and technology service providers, installation, image/content creation, display contract management and ESN operations. It could be expected that ESN Integrators such as ISMS and 2Bros Technologies noted earlier will grow rapidly through ESN deployment opportunities, while existing system integrators along with existing signage, kiosk, electronic display and telecom suppliers will seek to supply needed services for ESN.

Interoperability – Integration

A System of Systems

Since an electronic display offers a platform (i.e. safe, serviced real estate) to house sensors, cameras and communications equipment, ESN offers an “event-point” link to safety and surveillance systems. Emergency response personnel can use these on-location devices for pre-entry information.

Given its value in providing public information in public, urban and commercial environments, and the value of message override with current DIPA, the ESN can be expected to integrate with the Emergency Broadcast Systems for real-time public alert.

As the “Killer App” for revenue generation, ESN could be expected to be integrated with supply chain and marketing related tools and approaches. Loyalty cards and RFID offer display triggers to serve consumer needs.

Deployment Budgeting

Media Spending Will Shift For ESN Value

While ESN display has commercial advantage over existing display alternatives, budgeting cycles and approaches to media buying are retarding ESN growth. Display space buyers want more and better options for electronic display. What could be expected are;

- The directing of some media buys toward ESN pilot and initial installations
- “Notional allocations” of display spending in order to take advantage of new ESN display opportunities

- Suppliers to retail supporting in-store ESN display with advertising or product usage information.
- More ESN display spending proportionate to revenue generation and branding impact.

Importantly, ad agencies and media buyers will respond to the desire for better ad performance by re-proportioning display budgets away from long-term, single image media buys in favor of more “point-of-decision” and multiple media buy targeting.

*Public Funding
For ESN Value*

In the nearest term, given the value of ESN to public safety, funding agreements which assure ESN installation advancements and ongoing network planning and access could reasonable be expected from the public sector and publicly funded organizations.

Conclusion

Electronic Signage Networks represent the integration of now available technologies, and at a time when public safety needs are higher than ever before. These needs, along with the need for commercial success are ongoing. ESN has value in meeting each of these needs with the same infrastructure. These, in conjunction with the “win-win” money-making capacities of ESN, suggest that ESN is moving to the “Killer App” category that has served companies, people and the economy so well in the past.

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Apogee Partners reports on key trends in advanced and emerging technologies in the areas of digital communications and information technologies, materials and energy. Its focus is on the enabling value of innovations in supporting or advancing current business models in primary industry sectors such as security, automotive, aerospace, manufacturing, business services, entertainment, retail and logistics. See <http://members.rogers.com/apogeepartners>.

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Related Apogee Partner White Papers available at the Apogee partners website include:

- Electronic Signage Networks (ESN) for Homeland Security through Dynamic Image Provisioning Application (DIPA): (March 2004)
- Dynamic Image Provisioning Applications (DIPA) (November 2003)
- Investment Worthy Technologies (May 2003)
- Making Technology Happen (January 2003)

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