

Digital Signage in Industry



ADVANTECH – TELELOGOS Whitepaper

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I. Introduction – Context

a. Introduction

Digital Signage is a powerful lever for communication which uses information technology, the Internet of Things and smart devices (screens, networks, content servers). It can assemble and broadcast continuously all types of information (image, video, text feeds, etc.) on networked screens which can be installed in both public spaces and private settings. Screens viewed by specific groups (employees, customers, associates, suppliers, etc.) can broadcast information relating to, for example, the internal workings of a company or organization. Such information can be enriched with more general information, such as the time, weather forecasts, traffic reports and news.

The numerous benefits of Digital Signage are continuous and dynamic updating of information, customization in real time, instant broadcasting of messages to manage crises, reduced environmental footprint, drastic reduction in the use of paper, a modern image and, above all, improved communications thanks to the attraction and stimulation inherent in the images shown on the screens. The power of image over text has been widely documented (cf. Ralph Haber, 1960). Digital Signage enables the user to present all types of information through dynamic images and, consequently, to increase adhesion and memorization.

b. The context of Digital Signage in industry

Information is, in the industrial environment, primordial for workstations in workshops and on production lines and supply chains. It is essential for communicating goals, deadlines, production and quality indicators, safety rules, manufacturing plans and methods, maintenance programs, times, training opportunities, and so on, to the operators manning these workstations.



Traditionally, such information is conveyed to operators in the form of a list or paper posters, and is sourced for the most part from the production department's IT system that is dedicated to management and monitoring. Classic office equipment such as PCs, mobile terminals and tablets, devices which have become ubiquitous throughout companies, are rarely assigned to industrial workstations because their richness of functionality, high cost and bulk make them unsuitable. Because of this, Digital Signage brings to the table a modern, economical and powerful solution for the distribution of information in industrial production and procurement environments. When installed in a suitable location on an industrial site (for example, above a row of

workstations), each screen can be seen by several operators. Dynamic information loops broadcast management data (output goals, indicators, performance measurements, etc.) that is drawn from the production department's IT system in real time. This raw data is qualified and easily understandable through the insertion of automatically-generated images and graphical forms. Loops can also display messages on subjects such as safety, preventive maintenance and alarms that have been prepared by the production management teams. Attractiveness can be increased by adding more general information on the enterprise or the environment. When operators are better informed and information is more easily memorized, risks are reduced, performance is improved and the integration of employees into the enterprise is enhanced.

II. Solution

a. Standard Digital Signage system

A standard Digital Signage system includes the following components:

- **Screens** (LCD or LED screens, walls of screens, video-projectors, tablets, etc.) which are managed individually by a local, networked intelligence known as a **Player**. Players comprise "hardware", which can be a circuit board inserted into the screen or an external cabinet similar to an industrial PC with an operating system such as Windows or Android, and "software" such as an integrated software client. A Player can manage one or several screens. Each Player manages independently the display loops and the operating parameters of the screen(s) to which it is connected.
- A **server** is installed in private mode on the company's IT structure ("on premises" mode) or on the cloud in SaaS mode and hosts software known as the Content Management System (CMS).
- An **IP network** which can be a LAN (Ethernet, WiFi) and/or a WAN (Xdsl, 3G, 4G, etc.) and which enables the CMS and the connected players to communicate.
- **Multimedia content** (photos, videos, HTML pages, data feeds, etc.).

Administrators use the CMS interfaces (consoles) to import and save media content onto the server, to define the display sequences of the loaded content (list of consecutive screens), and to schedule and target the continuous broadcast of the sequences (broadcasting a specific loop on a specific screen at a specific moment for a specific duration).

The CMS connects to the Players through the IP network and "pushes" media content to them, along with the broadcast sequences and schedules.

The Players manage, in off-line mode, the screen broadcasts in accordance with the content and the instructions received from the CMS (content and instructions are stored locally). The Players can manage the screens in other ways too: scheduled sleep/wake times, Player status, alarm relays, and so on.

Such logs, commands and alarms are exchanged between the Players and the CMS server, the latter placing them at the disposal of the administrators.

b. Features of a Digital Signage system for an industrial setting

In addition to the characteristics already described, a Digital Signage system designed for a production line will comprise interfaces that enable it to display production management and monitoring data.

Digital Signage solutions designed for purposes such as advertising, education and displaying information in public places are not equipped with such interfaces and cannot be deployed in an industrial setting. Solutions that are suitable for workshops and production lines are systems that combine digital communications and data management. They feature user-friendly interfaces to manage the content as well as integration interfaces which comply with the access, security and traceability rules that apply to the enterprise's IT systems.

If the enterprise chooses a cloud-based CMS, it must pay particular attention to security and, on the server, isolate its environment and data.

Digital Signage players and screens used in industrial settings are rarely similar to models used in, for example, shops, streets, train stations and schools. In industry, durability is of prime importance. The market has robust players and hardened screens that can withstand harsh industrial settings (humidity, heat, aggressive fumes, etc.).

c. Deploying Digital Signage for industry

The deployment of a Digital Signage solution in an industrial setting is managed like an IT project with its phases of design, testing, validation, deployment and follow-up.

Message and image design is important and must be done in conjunction with the Communications Department, computer engineers, graphic designers and, in particular, the operators of production lines and workshops.

Integrators, heads of security and operators all play an important role in choosing the industrial screens and players, the fastening systems, the electrical supplies, the IP networks and where to locate the equipment.

Making the choice between an On Premises or SaaS infrastructure requires the deciders to consider not only investment and operating costs, but also technical specifications, performance and security (access and data).

Deployment must also take into consideration the designation of CMS administrators (whether internal or external to the enterprise), administrator training and the choice of content sources (images, videos, Web pages, feeds, etc.).

d. The TELELOGOS software solution

[Media4Display by TELELOGOS](#) offers all the functionalities required for standard Digital Signage:

- Player software running on Windows or Android and managing up to 4 screens (with up to four different feeds);
- CMS server, either On Premises or multi-tenant* SaaS;
- Easy-to-use console in Web mode;
- Centralized technical administration services of screens and players.

Media4Display

Additional functionalities are indispensable for integrating Digital Signage into the production management and monitoring system:

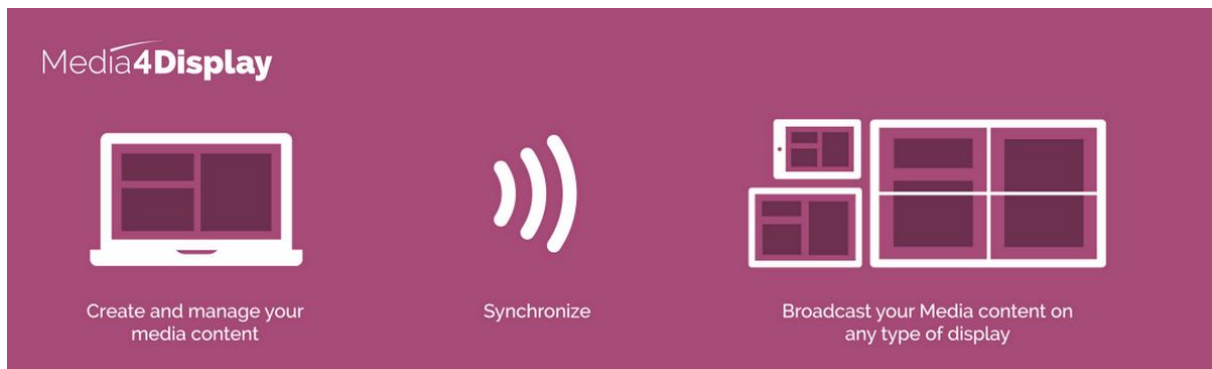
- API, to enable each Player to extract, in real time, data such as output goals, indicators and measurements from the production management system, or any other applications, in order to display them in images, widgets* or graphs. Data sources can be files (text, XML, CSV, HTML, etc.), databases, an email application calendar (Outlook) or RSS feeds;
- Remote control, via WiFi-enabled smart phone or tablet, of each Player to enable a workshop manager to temporarily modify the screen to display a customized message (alert, safety warning or encouragement);
- Secure engine to synchronize the CMS server and the Players to automate the exchange of data other than Digital Signage data;
- Watchdog to ensure the continuous functioning of the Players.

Whether installed on the enterprise's private IT structure (On Premises mode) or on the cloud (SaaS mode), the CMS server Media4Display can manage as many screens as required for one or several industrial sites, each screen or group of screens being able to broadcast at any given moment a specific and dedicated program. That the Players are always on the enterprise's private IT infrastructure means there are no problems relating to management data access.



Running a Media4Display CMS server has little impact on administrative resources. The easy-to-use Web console removes all operating difficulties for the administrators of the CMS server. Login authentication, role and permission management, and the content validation chain all comply with the security rules and requirements of the enterprise.

Administrators of the CMS server can be located at the "head office" or, thanks to the "local management mode", spread across the enterprise, with appropriate rights, from the head office to the production sites. Local administrators can use head office display programs or make their own display programs.

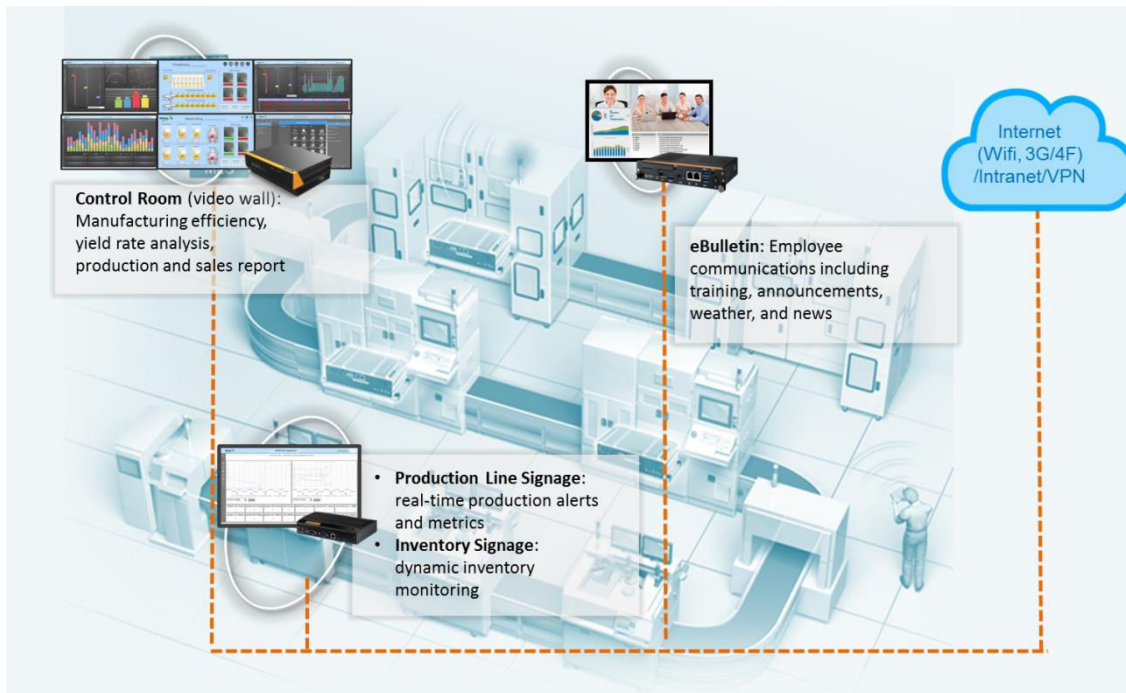


**Multi-tenancy allows a single physical server to process several distinct organizations (enterprises, subsidiaries, bodies, etc.) independently, separately and securely. This type of virtual architecture provides economical multi-client services in SaaS mode.*

**Widgets are applications included in the software which are associated with graphical forms. Widgets receive raw data and display it accordingly, and rapidly. Widgets are commonly used on websites and mobile devices to display information such as stock exchange prices and weather forecasts.*

e. ADVANTECH hardware solutions

Advantech provides comprehensive digital signage solutions for industry located in the production floor, inventory, and control room. In the Industry 4.0 model, all machines are connected and digital signage plays an important role in displaying critical production line alerts, plant metrics, and inventory levels. They help streamline communication and reinforce safety information for any modern production operation. Digital signage systems that are in different locations in the factory require different solutions. Some have different display output requirements from dual, triple, or even dozens of panels for a control center for example. Some have simple requirements, such as an eBulletin service where a single display or dual display is enough. Advantech has a comprehensive product portfolio from entry level to advanced digital signage models to fulfill different requirements for industrial digital signage applications.



Production Line /Inventory Signage:

Data visualization and digital signage are transforming manufacturing. Advantech digital signage products support dual and multiple output solutions that are ideal for real-time information such as in production usage, alerts, metrics and inventory levels. Take [DS-370](#) for example, [DS-370](#) is a powerful yet price-optimized fanless signage player powered by an Intel® Celeron® J1900 Quad-core processor. [DS-370](#) supports dual Full HD 1080P display output simultaneously. It also supports dual LANs, dual COM, Mini PCIe (3G, WLAN), and USB3.0 for data communication. [DS-370](#) offers several flexible storage solutions including 64GB Micro SSD on board, mSATA SSD, SATA-Slim, and 2.5" SSD/HDD drive bays. Its on-board Micro SSD design guarantees faster boot times and high performance read/write speeds. [DS-370](#) boots twice as fast as those using traditional hard drives. To prevent unauthorized access to your production data, [DS-370](#) is equipped with Flash Vault, which provides Write Protection + Read Protection. Once the function has been enabled, the whole disk or specific partition cannot be either read or written and all the data inside becomes inaccessible—like putting your confidential documents into a vault.



eBulletin: Considering that 40% of workers don't have access to email, factories often rely on bulletin boards to deliver their messages. Advantech OPS digital signage media player [DS-280](#) perfectly meets that need. [DS-280](#) is designed with Intel OPS (Open Pluggable Specification) standard. It can be seamlessly integrated with an OPS display on the wall with no cables or wires visible and enables easy installation,

operation, and maintenance. Most OPS signage players in the market only support dual displays and so limit the customer's application. Powered by the latest 6th generation Intel® Core™ i7/ i5/ i3 BGA processor, Advantech [DS-280](#) breaks this barrier and creates more possibilities by supporting three displays through JAE, HDMI and DP interfaces. It also delivers an exceptional 4K graphic performance through Intel® HD Graphics 530, supporting HEVC/265, AVC/264, MPEG2, VC1/WMV9, VP8, JPEG/MJPEG, VP9 video formats.



Control center (Multiple displays):

The control center is the heart of the whole factory. The control room monitors and controls the vital data collected from the production floor about manufacturing and labor efficiency, entry access control, environmental control (CO2, temperature and humidity), yield rate analysis, production reports and more. Data can be represented as graphics, metrics, real-time video etc. and often involves tracking multiple data sources on multiple displays, where high-quality capture and representation is important for communicating critical information. Advantech [DS-980](#) is an excellent cost to performance solution for six display video walls. Powered by 6th Gen. Intel i7/ i5/ i3/ Celeron rPGA processors (LGA 1151) and integrated Intel HD Graphics, [DS-980](#) not only offers exceptional computing performance, but also delivers the most sophisticated content up to 4096 x 2160 true 4K resolution. The series is equipped with 3 x HDMI outputs on board and can be expanded with 3 extra display outputs via built-in PCI Express 3.0 x16 expansion slots. Matrox C-series graphics cards have been validated for use in [DS-980](#) six-display systems. [DS-980](#) provides ultimate expansion capability and flexibility for six display video wall applications.



III. Consequences of using Digital Signage in industry

a. Displaying production statistics and raw data in real time

Digital Signage is a modern communication process which utilizes the characteristics and capabilities of digital solutions, such as connected screens, networks and centralized services that can control devices via the Internet (the Internet of Things, or IoT).

Digital Signage is an attractive solution for displaying multimedia content and is already well-known to the public in, for example, the retail and transport sectors where it replaces traditional paper posters, much to the satisfaction of consumers and users alike.

In the industrial sector, combining Digital Signage with a production management and monitoring system allows the user to display production data in real time across one or several production sites.

Production operators are consumers who are used to accessing qualitative information visually. Replacing paper listings and posters with Digital Signage shows operators that the enterprise has entered the “industrial revolution 4.0” era and is interested in keeping them better informed by supplying information that is appropriate, visual and attractive. Digital Signage is key to the development and rise of the Smart Factory where digital information and the Internet of Things contribute to technological progress and increased productivity.

Information feeds broadcast in real time are the perfect accompaniment to the entire range of production management methods, whether they be just-in-time, kanban, lean or agile.

b. Broadcasting messages related to production



In addition to the broadcast of production management and monitoring data extracted in real time from the IT system, Digital Signage can also inform operators of the following:

- **Reminders, rules and safety instructions:**
 - Safety alerts;
 - Contact details of the safety officer;
 - Number of consecutive days without an accident;
 - Subjects and dates of forthcoming safety training sessions on the production site;
 - Demonstration videos;
 - ...

Using the remote control function, a workshop manager who observes an abnormality can, via a smart phone or tablet, immediately interrupt the normal display loop to broadcast a message to alert or remind operators of a safety rule.

- **Manufacturing methods and organization:**
 - Ongoing processes and their goals (per day, week, month);
 - Performance statistics;
 - Quality indicators;
 - Quality audit schedule and results;
 - Work and break times;
 - Dates of preventive and regular maintenance operations;
 - ...



Digital Signage brings managers and staff of the methods, quality, procurement and scheduling departments closer to operators. Thanks to instant messages displayed on screens installed on the production lines, dialogue between operators and the various supporting departments are faster and more effective. For example, when goals are achieved, customized messages congratulating or encouraging the operators can be broadcast instantly.

Additional information can come from HR, Administration, the Executive Board and so on, which means that information usually shared uniquely with office staff can also be conveyed to operators on the production lines. Indeed, operators are rarely equipped with PC or mobile devices and thus have no access to the enterprise's email, Intranet or social network. Digital Signage can convey to them information on staff, scheduled tours of the production sites, general goals and results of the enterprise, and so on. Digital Signage allows management to develop greater consistency in its communications and leads to greater inclusion of the production workforce in the enterprise's overall culture. In difficult situations, Digital Signage reduces disruptive "noise" and allows the Board to communicate directly and accurately with the workforce.

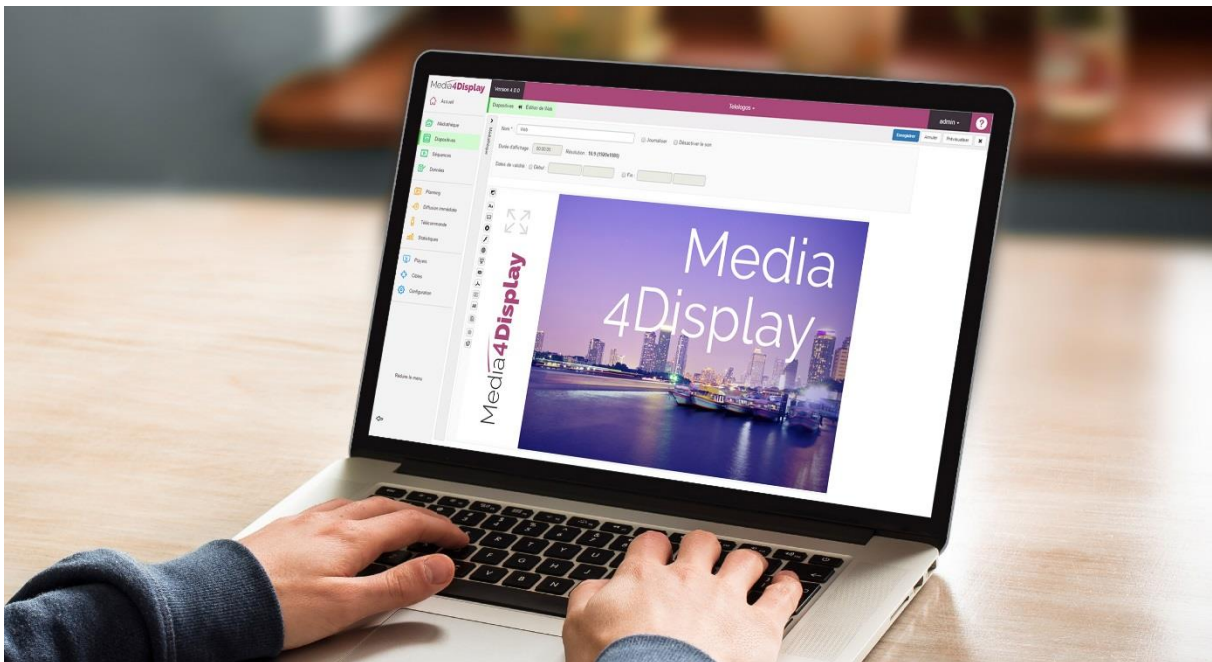
c. Broadcasting general information

Last but not least, investment in a Digital Signage system to provide digital communications on the production lines can be optimized by also using it in the enterprise's general communications effort. By installing screens in places other than the production lines, while continuing to use the same system and administrators to program the displays, the enterprise can improve:

- Reception of visitors (clients, partners, associates, suppliers, etc.), through welcome messages, plans of the premises and personalized instructions for finding meeting rooms;

- Communications to the entire workforce in rest areas (cafeteria, restaurant, gym, etc.), on subjects such as company events, activities of the works council, results, rewards, marketing strap lines and successes, and also general safety rules (escape routes, emergency phone numbers, etc.), working hours, closing times, holiday periods, and so on;
- Training, using appropriate media (video, etc.), broadcast at specific times in meeting rooms.

In general, Digital Signage can convey to any person in the enterprise controlled, dynamic and attractive information that is easy to remember thanks to the widely-recognized communicative power of images.



IV. Benefits of Digital Signage – Conclusion

Direct benefits of Digital Signage in industry are:

- Improved productivity;
- Reinforced safety and quality policies;
- More effective management;
- Workforce integration and inclusion;
- Time savings in dialogue between production lines and middle management;
- Easily-remembered instructions.

And beyond the production workshops and production lines, **the benefits for the enterprise are:**

- Improved general communications;
- Reduced environmental footprint;
- Modern and dynamic image, internally and externally.

The communications sector has, up to now, shown little interest in industrial environments, in particular production. Information comprising data that is fundamental to the production line is delivered to the operators of workstations on paper. It comes directly and unqualified from the production management and monitoring IT systems.

Digital Signage is a visual and attractive digital communications tool which conveys more effectively to operators the information that is essential for the management and monitoring of production. It also facilitates the memorization of such information and improves the integration of operators into the general culture of the enterprise. Safety information can be widely distributed and management can intervene directly by sending messages when necessary. Whatever the enterprise's organizational structure, operators on production workstations are better informed, better stimulated and, as a result, more committed and more productive.

Digital Signage provides dynamic, instant and continuous communications. It is part of the new industrial revolution (Industry 4.0 or Smart Factory) currently bringing the digital world to production lines and workshops.

What's more, investment in an industrial Digital Signage system can be optimized by extending its use to displaying other kinds of information on screens installed in other parts of the enterprise.

With Media4Display, TELELOGOS provides a Digital Signage software solution which is currently being used in numerous sectors (retail, banking, education, train stations, airports, etc.). Media4Display is fully compatible with ADVANTECH hardware. TELELOGOS and ADVANTECH are working towards the development of the Smart Factory by providing a high-performance and durable Digital Signage solution which is particularly suitable for industrial settings (aeronautics, engineering, food-processing, etc.).

