Maurice Doran
Digital Signage Consulting Services
Phone: (905) 426-3130
e-mail : me@mauricedoran.com
www.mauricedoran.com

Introduction to Digital Signage

INTRODUCTION

At a very high level, we can say that Digital Signage is a term used to describe networked computer systems that enable the dissemination of information and/or advertising to a targeted audience. The digital signage industry often refers to itself as "narrowcasting" or "digital-out-of-home" but it's branching out into many other areas.

The term narrowcasting is used to differentiate these technologies from live TV (broadcasting) where you transmit content using the airwaves and anyone with a compatible receiver can simply tune in. With digital signage you control what is shown, where it is shown and how often it is shown. The public at large cannot simply tune in to your private display network. It is a private network.

Out-of-home advertising (or outdoor advertising) is essentially any type of advertising that reaches the consumer while he or she is outside the home. Traditionally this would be printed billboards, posters, bus shelter advertising, etc…

So digital-out-of-home is the application of digital technologies to push advertising and information to the general public.

NEW TECHNOLOGIES, NEW USES

In the early days, digital signage meant hooking up a multimedia capable PC to a plasma screen or projector. The PC would communicate with a central server and receive content updates or a constant stream of data and display the material on screen according to a predefined schedule.

Since then, the industry has made significant progress and we now see many new fixed and mobile applications. We can show content on a wider variety of displays and in more locations than ever before (plasma screens, LED, LCD, e-paper, digital portrait screens, smartphones, tablet PCs…) and the list is growing. We're also pushing the boundaries of traditional rectangular screens with devices that let you create multi-shaped objects using rear-projection systems (consider the Christie Micro-Tiles or 3M Vikuiti Rear Projection Film). More recently, 3D glassless LCD displays have made an appearance and there are now several applications being developed to support this technology.

One hot new trend is large-scale architectural projection. Using very powerful digital projectors and dedicated software applications, artists and marketers are now using entire buildings as a backdrop for their animated content. They are turning buildings and large structures into massive displays.

BUT FIRST, THE ESSENTIALS

Here is what you need to get started in digital signage: PC equipment, one or more flat panel displays, some scheduling/playback software and ideally a network connection or internet access. Installations where network connectivity is not possible may also rely on mobile storage devices (usb memory, hard drives, CDs, DVDs…).

Currently, there are two types of digital signage software that you will encounter: self-hosted and software-as-a-service or SAAS products.

- **Self-Hosted**: You buy the content management/scheduling and playback software and you install it on your own equipment.
- **SAAS**: You pay a monthly fee to access a centralized server and management application online that is owned and managed by a third party provider. In some cases the monthly fee will include the playback application. Other providers will sell you the playback software but you will still need to pay a monthly network access fee.

Some software vendors can offer you either option. It usually makes sense for smaller screen network operators to go with a SAAS solution due to lower upfront costs. In cases where the user lacks in-house technical expertise, it may also make sense to go for a SAAS solution where the server is managed by a third party.

People who are concerned about security/privacy and who have the required technical expertise and capital will often opt for self-hosted solutions. This option provides total freedom in regards to server hardware and software selection. There is also the possibility of volume discounts.

However, if you are just beginning and don't plan to roll out a large number of screens in a short time span, SAAS may still be your best option.

OPEN SOURCE DS SOFTWARE

While most of the digital signage software in use is of a commercial nature, open source has also been growing in popularity. This trend can be seen in the educational sector, where digital signage budgets may be quite small and where there is an available pool of qualified and motivated participants eager to jump in and work around an open source product's idiosyncrasies. Open source solutions are not for the faint of heart, but the results can be quite good for those who have the time and the technical resources. In the right hands, these solutions can even rival commercial digital signage applications.

If you have a solid background in web and internet technologies, open source may in fact be a good fit for your project.

Here are a few examples of open source applications that are actively developed:

- Concerto – originally conceived at the Rensselaer Polytechnic Institute (also known as RPI) in Troy, New York. Users tend to be in the educational sector however there is no reason why this product could not be used in a commercial application.
- Xibo – was originally a commercial application that was turned over to the open source format when the developer could no longer support the product. This project originated in the UK.
- Rise Vision – is a semi-open source offering that is built on top of Google hosted services. Some of what they deliver is open source and they offer free and paid accounts. If you are an existing digital signage service provider or want to become one, Rise offers an unlimited Operator account that you can rebrand for $150/month. One word of caution, I have heard the team at Rise is a bit thin and support is not the greatest. Expect to use their forum a lot if you run into trouble.

True open source software is free and in most cases you can legally modify the code to fit your purpose. Companies offering products claiming to be open source but are in fact tied in to a service or other subscription based model (like Rise Vision) offer a step up from the pure "roll your own" approach but you should still be familiar with web technologies to fully exploit their solutions.

FREE AND SHAREWARE DS SOFTWARE

There is no such thing as a free lunch. Yes, you can Google "free digital signage software" and yes, you will find some links but from my experience most, if not all of these products, are worthless. Some have tried to build their business on the premise of free software coupled with paid services (content creation, hosting…) but most of these have failed. The few companies who still operate in this space offer in fact very little support so the end-user is pretty much out on his own.

Many of the free or almost free digital signage solutions rely on web browsers or Adobe Flash to deliver content at the PC player end. These are low-end solutions that can have some big drawbacks. First, you will be limited by the type of content you can play so be prepared to do a lot of file conversions. Second, web browsers are not the most stable applications to begin with. They were never really meant to operate in a 24/7 environment. A bad plug-in or poorly scripted web page and your PC can crash in a matter of hours due to a memory leak.

The Adobe Flash player has improved a lot since the early days. The software now takes advantage of the PCs graphics processing unit (GPU) so you will get much better performance on low-end PCs. Still, Flash alone is not sufficient to deliver a complete multimedia experience unless you know the ins and outs of the application and are adept at re-purposing and converting other types of content to the Flash format. Adobe has also stopped development on the mobile Flash player so who knows how long before everyone moves to another technology like HTML 5.

PROPRIETARY/COMMERCIAL DS SOFTWARE

The list of proprietary digital signage software is quite long and getting longer every day. It seems every month brings new players into this space and for good reasons. There is a lot of money to be made as this industry is in full expansion. As mentioned earlier, you have the self-hosted and the SAAS offerings but many innovative concepts are coming out. For example, Ayuda Systems offers a "pay-per-look" model where advertisers only pay if someone actually looks at their ads on screen.

People looking for a commercial DS application have a lot to choose from. There are the usual suspects like Cisco and 3M or early pioneers like Navori, Omnivex and Scala. Next are software solutions that come bundled with display hardware, like Samsung's MagicInfo. Then we have SAAS specialists Broadsign , Comqui and signagelive who have been around for a long time and have an extensive and loyal customer base. Mac users have fewer options but recently new digital signage software providers like Media Sign Pro and Sedna Presenter have stepped in to fill the gap.

Considering a digital signage software solution? Follow these steps:

1. Establish which type of solution best matches your needs. Self-hosted or SaaS.
2. Pick an experienced vendor and ask for customer references, current projects, etc...
3. Determine if the solution will be compatible with the equipment you already have or are planning to acquire.
4. Make sure the vendor is willing and able to support their product after the sale. Not always easy to do but critical if you plan to use their technology for any length of time.
5. Ask for the product roadmap to determine if the product has a future. Has the vendor planned the evolution of the product or have they locked down the development with no future update plans.

Your final choice of software platform will depend on your specific needs, your hosting preference and operating system of choice.

This document does not claim to list all current DS software vendors. The list is already too long and evolving daily as companies merge, evolve or disappear altogether. Rather is it is meant as a quick overview of the various opportunities and resources available for anyone considering this market.

DIGITAL SIGNAGE HARDWARE

PC Equipment

Most digital signage solutions require some type of PC hardware. Some solutions may operate on dedicated PC "appliances" but in most cases these software packages will operate on some flavour of Microsoft Windows, Linux or Mac OS. When considering a Windows compatible solution, look for compatibility with Windows Embedded. This embedded OS is a great fit for digital signage as it offers lower cost, requires less hard drive space and has none of the consumer features that other Windows versions carry. Windows has the largest installed base of any OS so it is always easy to find technical expertise whenever necessary.

Linux seems to be the operating system of choice for SAAS providers like Broadsign. Linux offers good performance at a very low cost but in the past there have been issues with finding all the necessary device drivers required by some PC components. Linux has its proponents but it is not the most popular platform so expertise in this OS is not as easy to come by.

The Mac OS is obviously installed on every piece of Mac hardware even though it is now possible to run Windows on a Mac. There are few digital signage software applications available for the Mac and higher hardware cost is preventing this platform from really taking off in the digital signage market. You can run Windows on your Mac PC but most users would rather stick with the native OS and forego any potential issues.

It is probably best to select your digital signage software platform first and then select your hardware accordingly. Reason is most software is only available on a single OS. If you have an affinity with a specific OS for corporate policy or technical reasons, establish this first and then pick the best solution available for your OS of choice.

Your PC hardware should offer the best performance in the smallest footprint available (assuming you will be mounting your PCs near or behind your screens). Look for a PC case that provides VESA mounts or some type of mounting bracket as this will greatly simplify installation using the VESA mounting holes at the back of the screen.

Low power PCs like the units that run on Intel Atom processors and nVidia ION graphic chipsets will often be available in the smallest cases and many will be offered in a "fanless" design. These units rely on an external power brick much like the ones used for laptops. AMD is releasing new FUSION CPUs and graphic chips that will power small form factor PCs much like the Intel Atom/ION units. All these make excellent low-cost single output DS players capable of 720p (HD) video with some able to achieve 1080p (Full HD) video playback.

It should be noted that these specs are currently used by many PC manufacturers who market dedicated digital signage/home entertainment PC Systems such as Zotac ZBOX, Aopen Digital Engine Nexcom Digital Signage Players and Asus EeeBox PC.

You will find both consumer and commercial grade equipment at this level. Your choice will be dictated by your budget (consumer grade is less expensive) and tolerance to equipment failure (commercial grade is more robust and usually supports more options like an add-on video or TV Tuner card).

If your application requires pushing video to more than one screen per PC, you should consider a dual or even quad core CPU. The Intel i3, i5 and i7 CPUs are all quite capable of driving multi-screen applications assuming they are paired with a sufficiently powerful video card. Same can be said of the latest AMD multi-core CPUs although Intel still offers the fastest chips.

Look for video cards from nVidia, AMD (ex: ATI), Matrox. Intel has not been renowned for its integrated video cards but new models are constantly being released to market. Anyone contemplating digital signage should test their target hardware with their software of choice.

On the storage size you have a couple of options: Conventional electro-mechanical hard drives or solid-state-drives (SSD). For most DS applications, a conventional 7200 RPM hard drive will do fine. If you are installing your PCs in a harsh environment or if extreme reliability is required you may want to consider spending more for SSD drives. They have no moving parts and are less susceptible to failure over time.

When selecting the type of PC to use for your project, you should ask yourself the following questions:

a. Am I installing my hardware in a location that is difficult to reach or that requires a lot of effort to get to (above a suspended ceiling, in a separate room nearby, in an industrial space with a very high ceiling)?
b. How much harm in having a blank screen for a few days while I source a replacement PC because the one installed at the location broke down?

If you're able to easily reach the damaged or defective equipment and you're not relying on ongoing ad revenue then you can probably get by with consumer grade equipment.

If on the other hand you can't easily reach the equipment and you're relying on ad revenue then you may want to invest a more and use only commercial grade equipment.

Here are a few more well-known hardware manufacturers who offer both consumer and commercial grade PC equipment:

Advantech, A-Open, Asus, HP, iBase, Habey, MediaVue, Sherlock Systems, Stealth PC.

Integrated PC/Displays

Many flat panel display manufacturers offer integrated PC systems as add-ons to their commercial display lines. For example, companies like Samsung offer built-in or optional "slide-in" computer modules that are quite capable of displaying multimedia content. These integrated displays are delivered with the company's own proprietary software solution but many other software solutions can also be substituted.

TIPS AND BEST PRACTICES

Here are a few suggestions for your deployment.

- If you are deploying more than a couple of screens at your location, plan to install one digital signage unit (PC and screen) in your office, preferably in the office of the person who will be in charge of managing and scheduling your content. This way you can push updates locally and confirm everything looks right before you push the update to the remote screens.

- If you are deploying screens in remote locations and need to provide full proof of playback, consider installing a remote webcam aimed directly at the screen (this works really well for large outdoor LED billboards). This way you can visually confirm the display is running at any time without impacting playback.

  Alternatively, you can use Windows Remote Desktop, VNC, LogMeIn, GotomyPC or any other remote control application to access the remote PC. Be aware some digital signage software applications may be affected by remote control software so you should test on your solution before you deploy this out in the field.

- If you are installing more than a couple of screens, try to stick with a single PC configuration and make a disk image before rolling out your equipment. Use the same disk image to prepare all your PCs for deployment. This will save you time and make your life A LOT easier. Look at Norton Ghost and Acronis TrueImage to create and replicate your disk images.

IN CONCLUSION

There has never been a better time to consider digital signage. There are a lot of mature hardware and software solutions to choose from and prices are at an all-time low. However, the best way to ensure success is to plan ahead and work methodically. It's easy to get lost in the details as you navigate through hardware, software and network communication issues. Switching hardware or software solutions in mid-deployment is a sure-fire way to create major problems down the road.

The trick is to stay on plan, test well ahead of deployment and document everything. Staff will come and go so make sure the knowledge have built over the weeks and months doesn't walk out the door.

Work with well-established suppliers and remember that volume will always ensure better pricing. Some software vendors only service very large deployments so if you are purchasing a couple of licenses, be prepared to look for alternative suppliers (resellers) or consider another solution altogether.

I hope this document will prove helpful as you get started in this exciting new communication sector.

Any questions about this document should be directed to:

Maurice Doran
me@mauricedoran.com
Skype: mauricedoran

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