White Paper:

The TCO Advantage of Smart Signage

Cutting Costs & Optimizing Networks with Smart Signage

Driving down costs and reducing complexity in the deployment of digital signage has been a constant goal of systems integrators, solutions providers and end users since the industry's early days.

Costs for display and other signage hardware have steadily dropped through the years, while their power and capabilities have increased significantly. Content management systems for digital signage are now much easier to use and maintain, and they're capable of doing much more — while at the same time being much less expensive than in the past. In both hardware and software, a crowded and competitive market has forced pricing down for most vendors — helped along greatly by technology advances.

That drive for cost-effective and simplified digital signage never ends.

In the past few years, System-on-Chip (SoC) displays pioneered by Samsung have come on the scene. These all-in-one displays are marketed with the proposition that designing and delivering a variety of digital signage projects is even more

cost-effective and streamlined when the media player is integrated within a professional display. Think of these displays as the pro A/V versions of Smart TVs. They share the same DNA, but Samsung's Smart Signage differs in many ways from TVs.

This white paper looks at the Total Cost of Ownership (TCO) argument for SoC-powered smart displays versus what could be called "traditional digital signage" set-ups that use external media players and related hardware. It also runs numbers on how costs are trimmed, and what that means for IT and operations decision-makers. Based on conservative calculations across three common or emerging scenarios, the study finds that using a Smart Signage solution can reduce the TCO over three years by as much as 41 percent when compared with traditional digital signage set-ups.

The paper also explores the technologies "under the hood" of these smart commercial displays, and how integrators and solutions providers are using Smart Signage displays for a diverse range of applications.

About the Author

Dave Haynes is a digital signage industry consultant and market analyst perhaps best known as the editor and publisher of Sixteen:Nine, an online publication and now podcast that has chronicled the industry since 2006. Respected and widely-referenced because of his real-world subject matter expertise, Haynes has done advisory and consulting work for some of the world's best known brands. But he has also worked with startups to set them in the right direction. Haynes is based near Toronto.

The Case for Smart Signage

Smart displays have been touted as the future of mainstream digital signage for several key reasons:

Less Hardware

A typical digital signage installation has a kit of parts: display, media player, signal and power cables, media player cradle and mount. With smart displays, the footprint is reduced to the display, one power cable and a simplified mount. The media player, most of the cables and the player cradle aren't needed.

Faster Deployments

Technicians charged with installing digital signage have fewer components to bring in, unpack, mount, connect and switch on. Less work usually means less time needed on site, which means faster deployments and lower labor costs.

Power Savings

Using an internal media player removes the need and energy draw of an external device, whether that's a media player or mini PC. As energy costs climb, that saving grows increasingly meaningful.

Dynamic Content

Smart displays fully support HTML5-driven animated graphics, making it possible to radically trim creative costs by instead using templates that change dynamically, based on real-time data.

Easy Troubleshooting

Getting help from local staff when a PC-based player has locked up is difficult. A fix might need a keyboard and mouse plugged in. With SSSP displays, local staff can remedy many problems just by using the provided remote to turn the display off, and back on again or remote staff can issue a reboot command.

The Smart Signage Story

Then

Now

Digital signage has always involved a buddy system: A media player outputting content and sending that signal to a professional display. In the early days of the industry, this almost always involved a full desktop PC or a server the size of a breadbox, located somewhere near the display, connected by signal cables. Over time, those PCs got smaller, and dedicated non-PC devices came on the scene, making it possible to mount the player immediately behind the display panel. These players have also come down in costs, while at the same time growing more powerful and capable.

But the buddy system remained the standard — a screen needing a player — until 2013 when Samsung became the first commercial display manufacturer to go beyond tinkering and aggressively market a line of displays running on the concept of integrating SoC processors inside its commercial display panels. Called the Samsung Smart Signage Platform (SSSP), the proposition was simple: Eliminate the need and cost of a

separate media player.

These new smart displays used the same type of CPUs used in smartphones, tablets, and smart televisions, and when the Samsung series launched, they were billed as being capable of running light-duty digital signage applications. For example, they could function happily as digital posters and menu board displays, and run HD video.

Where is Smart Signage Today?

Four years later, most mainstream commercial display manufacturers now have some version of their own smart digital signage displays. The general opinion is that the current generations are much more powerful and can handle most conventional digital signage projects. Samsung has been the most aggressive manufacturer and marketer – with the SSSP now entering its fifth generation. SoC-integrated displays cover the full spectrum of panel sizes, and across multiple series. It's possible to get a 10-inch Smart Signage display useful

for meeting room sign and retail marketing applications, but also smart displays as large as 82 inches, often used in high-end retail environments.

The current generation of SSSP displays have computing and graphics power competitive with mainstream external PCs and dedicated media players. For improved customizability, partner software developers are now working with an operating system that offers more capabilities and is used for a wide variety of devices, from IoT sensors to smartphones and smart appliances. more capabilities and is used for a wide variety of devices, from IoT sensors to smartphones and smart appliances.

What's in a Smart Signage Display?

CPU	Memory	Signage Software
Quad Core Processor	1.5GB DDR3	MagicInfo or SSP Partner CMS-Ready

Storage		Video Processor
4GB FDM	**SMART** SIGNAGE PLATFORM	Full Codec, High Performance HTML5, HEVC H.265, H.264, WMV, WebM

The Evolved Experience of Tizen

Tizen is a cross-architecture, open source software platform based on the Linux operating system that provides full compatibility with HTML5. Tizen is entirely web-compatible, supporting animated graphics and HTML5 content. That means better computing and graphics performance for displays, with animation performance boosted three-fold in the new fifth-generation SSSP displays that are using Tizen. Software developers working with Tizen generally say the gap is rapidly closing between the capabilities of SoC and PC-based media players.

The latest SSSP displays are also built on Samsung Knox, the defense-grade security platform present on Samsung's Galaxy smartphones and tablets. Knox ensures security from the hardware on up to the platform and application layers. The fourth-generation SSSP series last year received Common Criteria certification, an international ISO-level

standard for computer security.

The switch by Samsung from a signage-specific operating system to Tizen has opened up new possibilities for the developer community. It has attracted web, mobile and device developers who already work with Tizen and can now branch into digital signage and interactive display applications, without needing to learn a new operating system. Much of

what they've developed easily "ports" to smart displays.

"Why use Tizen? Power. Power. Power," says Vince Sellen, senior software developer at LSI Industries, Inc. "The Tizen-based display allows you to develop software at several levels, from simple web applications that run on the display but also can access the local system, to lower-level code that can take full advantage of the power of the chip."

The SoC Debate

SoC displays are seeing widespread adoption globally — and most industry observers expect this technology will gradually supplant PCs and most other types of media players. However, not everyone is a fan. Detractors argue:

SoC displays are underpowered:
In the first-generation product lines, that was true. But the latest generations are using the kinds of processors used by high-end smartphones.

Development is hard:
Development requirements and timelines have dropped substantially with the use of open operating systems like Samsung's Tizen OS.

SoCs aren't secure:
SSSP displays use the same technology as Samsung Knox, which provides defense-grade security. The latest generation received Common Criteria certification in 2016, an international ISO-level standard for computer security.

No future-proofing if network requirements change:
Worst case scenario, if an SoC panel cannot handle the changed requirements of a network, they can function as "traditional" displays, driven by a backup external player.

Devices can't be managed remotely:
CMS software platforms and third-party software tools provide extensive remote monitoring and management capabilities.

Use cases are limited:
Faster processors and evolved software means there are only a handful of unsuitable Smart Signage applications. SoC applications are commonly found in quick-serve restaurants, as well as grocery, retail, education, corporate and hospitality sectors.

Total Cost of Ownership with 3 Scenarios

Developing a TCO Model

Total Cost of Ownership is simple in concept, but can often be difficult to quantify using real world numbers and conditions. It's particularly challenging to come up with numbers when every digital signage deployment is just a little different in size, scope and complexity. To overcome that, this paper looks at three straightforward scenarios that reflect what's happening in the digital signage marketplace today, including what's emerging as a popular use case.

Specifically, the TCO model runs through the numbers for modest deployments in which screens each have unique content, tiled display setups such as digital menu boards in which programming is periodically synchronized across multiple screens, and configurations that use dynamic data and do not require commercial content management software to function.

Scenario

1

Standard Screen Deployment

In this most common scenario, an organization has one or several locations that are using digital signage to communicate to customers or to staff. The use cases include:

- Local and chain retail
- Educational institutions
- Healthcare
- White and blue-collar workspaces

Scenario

2

Tiled Displays Deployment

In this scenario, facilities use multiple displays in groups — typically "tiled" side-by-side — to show a wide range of information, from menu and ticket information to featured events and attractions. The screens operate independently but are synchronized on a schedule to use all screens for one cohesive message. The use cases include:

- Quick-service restaurants
- Museums and theme parks
- Cinemas
- Airports

Scenario

3

Content Management System-Free Deployment

In an emerging scenario, digital signage projects are being run without the use of specialty content management system (CMS) software with each player using the built-in web browser and tools such as HTML5 and JavaScript instead. The use cases include:

- Office and industrial workplace communications
- Control rooms
- Mass transport hubs
- Events facilities

For each of the three deployment scenarios, the TCO model examined both upfront acquisition costs and some ongoing operating costs. It includes hardware prices for the displays, media players, mounts and cables reflective of pricing from national resellers, or published MSRP pricing as of May 2017. Systems integrators and software vendors were consulted to estimate software, installation and hardware maintenance costs.
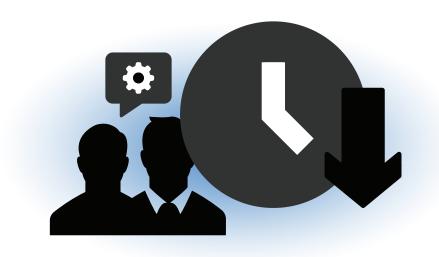
Upfront Acquisition Costs

For all three scenarios, a SSSP-enabled 55-inch LED-lit LCD display (model DB55E)[1] is compared to a 55-inch LED display, with comparable specifications, from another top-tier vendor that would typically be "in the mix" when procurement decisions are made. Commercial-grade wall mounts are allocated, with the installation requiring a separate media player using a mount that accommodates and secures that device. A solid-state media player from Seneca Data[2] was identified as the default PC, because the hardware is widely respected and its price-point is at industry standards for x86 PC media players. The lack of a player and A/V cables means a less expensive, streamlined mount is used for a smart display.

Installation Costs

Integrators estimated on-premise installations required about two hours for a Smart Signage display, with an additional 30 minutes added for installations that use a separate media player and the related cabling.

Ongoing Support Costs

The annual electricity cost assumes 360-day operation, running at 16 hours per day, with a $0.1124 per kWh electricity rate. Some scenarios may see screens running for shorter durations, and darkened on weekends, but 16 hours a day/seven days a week is very common. Electricity pricing was derived from a typical Midwest metropolitan area — Kansas City, Missouri.

All other cost elements vary by scenario type and are detailed in each scenario discussion. Depending on the size, location and the complexity of deployment, actual costs will vary.

Other Considerations

This TCO analysis does not include other considerations that also have a positive impact on the operations side of digital signage networks. There are too many variables and mitigating factors to fairly compare PC-based networks to those running on SoC technology, but solutions providers noted:

• Smart displays remove what are sometimes common points of failure like distribution amplifiers, HDMI over CAT5 equipment, and poor quality video signal cables.

• On-premise repair calls — often called truck rolls — are greatly reduced because of easier remote troubleshooting. A locked-up PC can require a keyboard and mouse to reboot, as well as a technically savvy customer on-site. With smart displays, on-site staff can do the hard reboots that remedy many problems just by turning the smart sign off and back on using the provided remote control — no $200+ truck roll needed. Vince Mitchell of Pacific Digital Signs says on-site repair calls have dropped by half by switching from PCs to Smart Signage displays.

• Solutions provider Ping HD says with SoC panels there is no need for technicians to pre-load software and the initial load of content at their facility, as they would've had to do if using PCs. The SoC panels are drop-shipped directly to installation locations, and software and content will update as soon as connectivity is established, says CTO Kevin Goldsmith.

"Vince Mitchell of Pacific Digital Signs says on-site repair calls have dropped by half by switching from PCs to Smart Signage displays."

Applying a TCO Model to the three main scenarios:

1 Standard Screen Deployment

This TCO model assumes five LED back-lit displays are deployed in a single location, like a retail shop. It assumes that regardless of the hardware, the same CMS software application is used to manage the same functionality, and content management and creation capabilities. Costs for the conventional model are higher for two key reasons:
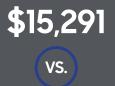
• The need for a PC per display

• Higher overall energy costs from the display and PC

The model showed Smart Signage lowered costs by 11 percent.

For environments that would require more than five displays used in this scenario, calculations involve simply multiplying the unit cost by the number of units. As with any project, there are variable "economies of scale" that might factor in — with volume orders of hardware almost always resulting in price discounts. Using a dual-output PC would, in theory, reduce the number of PC players needed, but the per-unit costs would likely be higher.

Cost Per Location Over Three Years...

Traditional Digital Signage

$15,291

vs.

Samsung SSP

$13,663

Lowers cost by 11%

Breakdown

TCO Components	Traditional Digital Signage	Samsung Smart Signage
Displays	Tier 1 55-in.	Samsung DB series 55-in.
Media Players	Seneca Data HDS	Built-in SoC
Mounts	Mount with Secured Player Bracket [3]	Standard Tilt Wall Mount
Cables	HDMI and RJ45 Ethernet	RJ45 Ethernet only
Installation Labor	2.5 hour on-site per unit	2 hours on-site per unit
Power Consumption	Cost of power for **5 Displays, 5 Media Players**	Cost of power for **5 Displays**

2 Tiled Displays Deployment

Displays tiled together, side by side, are often seen in food services and attractions environments, showing menus and pricing. Usually, operators using these types of configurations will push specific content to specific screens most of the time, but will schedule periodic "takeovers" that see all screens showing either the same content on each screen or one content element that spans all the screens.

To do that with a PC set-up, a system integrator will commonly drive the content and synchronize all the screens using a powerful multi-head PC and CMS software, with the PC typically costing $1,500[4] or more. Achieving the same visual effect using Smart Signage displays is possible using a $30 network switch.

Software costs would be the same in either scenario, though some CMS providers may charge for one player license instead of five. The model showed Smart Signage lowered costs by 10 percent.

Cost Per Location Over Three Years...

Traditional
Digital Signage

$15,199

VS.

Samsung SSP

$13,722

Lowers cost by 10%

Breakdown

TCO Components	Traditional Digital Signage	Samsung Smart Signage
Displays	Tier 1 55-in.	Samsung DB series 55-in.
Media Players	Multi-head PC or Video Wall Endpoints	Built-in SoC
Mounts	Mount with Secured Player Bracket [3]	Standard Tilt Wall Mount
Cables	HDMI and RJ45 Ethernet	RJ45 Ethernet only
Installation Labor	2.5 hour on-site per unit	2 hours on-site per unit
Network Switch	Not Required	Netgear 5-Port Gigabit Switch
Installation Labor	2.5 hours on-site per unit	2 hours on-site per unit
Power Consumption	Cost of power for **5 displays, 1 large powerful PC**	Cost of power for **5 displays, 1 switch**

3 CMS-Free Deployment

Increasingly, specialized end users are running content on their signage networks that do not need a commercial content management system to play out the content. This happens most often in scenarios involving dynamic data from real-time sources, such as mass transport information, on-premise management systems, social media or customer relationship management systems.

In these case, operators are using templates and scripting, combined with a browser as the presentation tool and player, to show content that is set once at start-up and then dynamically adjusts what's on the screen based on the incoming data.

Examples include Salesforce

opportunity pipeline charts running on screens on the sales operation floor of a company, or real-time key performance indicators (KPI) charting on screens visible behind the scenes to grounds crews at a major airport. The scenario assumes reliable, hard-wired network connectivity at the venue.

Doing that conventionally requires a separate media player that supports full HTML5 playback, like the respected BrightSign HD223 player.[5] Samsung Smart Signage displays natively support full HTML5 and the same results are possible without additional hardware costs, or a CMS.

The model showed Smart Signage lowered costs by 41 percent.

Cost Per Location Over Three Years...

Traditional Digital Signage

$15,570

vs.

Samsung SSP

$9,163

Lowers cost by 41%

Breakdown

TCO Components	Traditional Digital Signage	Samsung Smart Signage
Displays	Tier 1 55-in.	Samsung DB series 55-in.
Media Players	BrightSign HD223	Built-in SoC
Mounts	Mount with Secured Player Bracket 3	Standard Tilt Wall Mount
Cables	HDMI and RJ45 Ethernet	RJ45 Ethernet only
Installation Labor	2.5 hour on-site per unit	2 hours on-site per unit
Power Consumption	Cost of power for **5 Displays, 5 Media Players**	Cost of power for **5 Displays**

Industry Perspectives on Smart Signage

"Our support issues have dropped by about 90 percent."

- Kevin Goldsmith,
  CTO, Ping HD

"Signagelive has supported SoC displays since 2012 and over the last five years, SOC displays have grown to represent over 50 percent of the total devices connected to our platform. Moving from Windows PCs to SoC displays has seen a major reduction in support issues being handled by our team. We have also experienced 73 percent year-on-year growth for 2015/16 due, in large part, to the reduction in costs, complexity and failures, and increase in reliability that SoC displays have brought to the digital signage industry."

- Jason Cremins, CEO, Signagelive

" We have definitely seen a reduction in support hours and service calls as we've continued to migrate from systems running on Windows and older displays, to the Samsung Smart Signage platform."

– Vince Mitchell,
  CEO, Pacific Digital Signs

" Smart Signage instead of traditional digital signage set-ups can reduce the TCO over three years by…
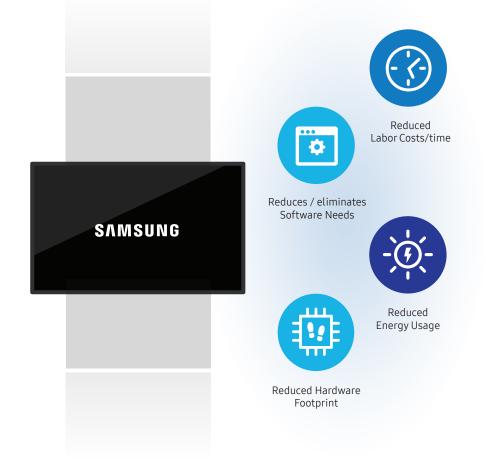10 to 41 percent "

"With the current Samsung SoC, we are able to run our applications smoothly with the power of the new Tizen chip. This allows us to offer solutions that eliminate the costs and hassles of the classic media player setup. The value of running our software on the SoC system is in the ability to limit the number of failure points in a system design. There is no need for an external PC, line extenders or splitters … the power of this chip technology and the Tizen OS has brought down the walls between vertical markets; it can now be used for any verticals."

-Vince Sellen, senior software developer, LSI Industries, Inc.

Summary

This comprehensive TCO analysis comparing traditional digital signage with SSSP shows a significant upfront and ongoing cost advantage. Three-year total cost savings range from 10 percent to 41 percent, depending on the scenario used. Cost savings come in a reduced hardware footprint, as well as through reduced time on site doing installations and reduced energy usage. In one scenario, even the need for a content management software subscription is completely eliminated.

The TCO analysis is tied to several key differences in the design of the Samsung Smart Signage solution – which reduces the hardware footprint, labor costs, energy usage and potentially reduces or eliminates commercial software needs.

Reduced
Labor Costs/time

Reduces / eliminates
Software Needs

Reduced
Energy Usage

Reduced Hardware
Footprint

Footnotes

1 Top-Tier Vendor Reference Display - NEC E556 E Series - 55" LED display

2 PC-based Digital Media Player - Seneca HDS-V2 - digital signage player

3 Mounting brackets - Peerless-AV

4 $1,500 allocated for multi-head video card built into an i7-class PC

5 BrightSign HD223 - digital signage player

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