

The Video over IP Revolution

Broadcast Video over IP in Digital Signage

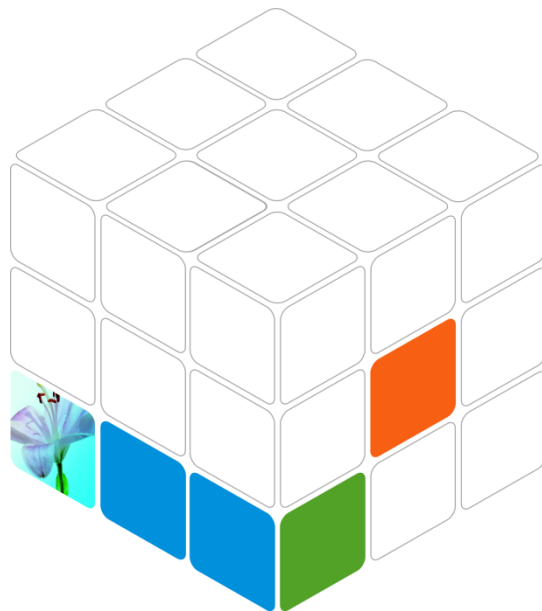




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Introduction

Video connectivity has changed several times in recent decades. First, it went from low quality to high quality analog connection. Then, analog video was replaced by digital video. At the beginning of the digital video revolution, video was mostly used with special video interfaces, such as IEEE-1394 or SDI (a professional digital video interface).

Broadcast TV has undergone a similar change, and across the world video is delivered digitally by cables, terrestrial and satellite-based video service providers.

The availability of fast networking, both local and broadband, has changed the way video is transferred. Rather than being transferred over dedicated interfaces, video is sent over standard networks, just like any other type of data. When video is sent over a standard network it is often called *video over IP*.

This document sheds light on video over IP flavors and their relevance to digital signage.

Live Video in Digital Signage

Broadcast Video

Many digital signage age systems make use of broadcast live video. In many cases, broadcast video must be part of the displayed content, such as in bars or health institutions. In the past, broadcast video required an analog tuner card installed in the player. Today, broadcast video is available digitally in compressed form. In a domestic setting, a set-top (STB) box is used to receive the digital stream, decodes it and displays it on an attached display using a digital or analog connection.

The requirements for broadcast video in digital signage systems may include

- Embedding the video inside the digital signage layout
- Keying additional graphics and video over the live broadcast
- Avoiding using a *set-top box* and a capture card per player
- Using the highest quality video available

Possible approaches for connecting digital video and digital signage systems

- Use a capture card in every player receiving broadcast video and attach a set-top box to it
 - Connectivity may be limited to analog, since the digital output from the STB may be protected. Hence quality may be lower.
 - Pricey.
 - There is no simple way to control the current STB channel.
 - Most digital signage systems support video capture. Some support multiple capture cards in a single system.
 - Capture device cannot be USB-based if high definition video is required.
- Use a digital tuner inside the player; since the received stream is compressed USB 2.0 is sufficient
 - Best possible quality.
 - Protected channels cannot be used. Free channels can be used.
 - The input device must match the type of the digital network (satellite, cables, terrestrial).
 - The digital signage software must support digital video reception.
- Use either of the above to multi-cast content into multiple players
 - A single capture card can ingest video from an STB and send it to multiple clients.
 - Network infrastructure should support multi-casting and the required bandwidth.
 - Some IP streamers have built-in error correction; it may be required in some cases.
 - The digital signage software must support the stream and error correction if one is deployed.
 - Provides an elegant solution for large video wall comprising more than one computer.
- Use an IP bridge
 - IP bridges receive multiple digital video streams. Streams can be encrypted, since many bridges have conditional access cards for legal decryption of the digital streams.

- The digital signage software must support the stream type produced by the bridge.
- Provides an elegant solution for large video wall comprising more than one computer.
- Some available products:
 - <http://www.adi-vt.com/upload/File/products/XStreamer.pdf>
 - <http://www.haivision.com/products/torpedo>
(supports free channels only)
 - http://www.satec.at/iptv/IPTVFolder_en.pdf

Live video on location

In many cases video is created on location and is required on multiple screens across a venue.

Requirements for live video on location

- Low latency, the delay incurred by encoding and transmission should be minimal
- Multiple live sources available at multiple receivers
- Support for stretching a live video source across multiple screens (video wall)

Possible approaches for live video on location

- Use a dedicated video infrastructure and video matrices to route signals to digital signage players equipped with capture cards
 - Expensive, both infrastructure and player side hardware.
 - Inflexible in routing multiple concurrent inputs into a single player, since they require a physical input per active video source.
 - Very low latency, practically negligible.
 - Complex and complicated when video wall of more than one driving computer is used.
 - No video compression.
- Encode video at the source into high quality video over IP
 - Inexpensive and flexible.



- Low latency, depending on the solution. Can be lower than 100 milliseconds end to end.
- Receive multiple live sources in every player with no additional hardware, only network connection is required.
- Provides an elegant solution for large video wall comprised of more than one computer.
- Compression is used, should not be a problem if compression is as good as post production ready compression (which is good enough for decoding, editing and final compression).

Some additional Video over IP scenarios for digital signage

With the growing popularity of IPTV networks, IP set-top boxes are cheaper than ever.

IP based set-top boxes can provide a digital signage distribution alternative to existing methods of displaying a single content channel on multiple displays.

Existing methods are usually based on distribution through CAT5 extenders. Such extenders are mostly analog and require a dedicated cabling infrastructure.

Instead of using CAT5 extenders, the digital signage content can be streamed from a player through the existing network infrastructure.

- C-nario players can encode and stream the output into most standard IP set-top boxes.
- A standard video over IP streaming box can be used; such an encoder should provide suitable computer connectivity (VGA, HDMI , DVI or Display Port).
- An IP-based set-top box is required at each display.