

The end of the CG? Exploring new ways of doing broadcast graphics using web technologies

By Stewart McGhie
Head of Sales
Crystal Vision Ltd.



Introduction

Originally the broadcast industry used big, expensive dedicated hardware boxes to produce their on-screen graphics. This was because in those times broadcasters' requirements were unique and the artistic demands continually pushed the boundaries of available technologies.

Although the power of PCs has rapidly increased, and they are the common hardware platform these days, they still usually run proprietary software for the creation and playout of the on-screen graphics for broadcasters. This has the disadvantage that dedicated broadcast graphics products can be costly, lock users into a single platform and require specially trained staff.

Meanwhile the design and presentation of graphics on websites have become ever more sophisticated. Modern websites are full of fancy graphics, text, animations and images. Many of today's websites have dynamic data content, accessing databases or third-party data feeds containing prices, stock levels, results, news or other such real-time content.

There is clearly an overlap now between the graphics that are produced for TV channels and the graphics produced for websites. It therefore makes sense to find common tools for the two requirements. This is especially true when you consider that broadcasters are themselves producing content for both platforms.

The common solution has been to use web technologies for both. There are a number of advantages to using web technologies...

1. A wide range of creation tools available.
2. The low cost of creation tools.
3. A large pool of talented programmers and designers.
4. Cross platform capability for both software and hardware.

Ways to create the graphics

There are a lot of different technologies that are relevant to the construction and running of websites, but at the heart of most are a few fundamental ones: HTML, CSS3 and JavaScript.

Using HTML, CSS3 and JavaScript

In its simplest form HTML coding can be used to define a simple text caption with just a few lines of code...

```
<DIV STYLE="position: absolute; TOP:800px; LEFT:400px; WIDTH:1900
HEIGHT:80px; background-color:blue">
<span style="font-family:Arial; font-size : 28pt; color: white" > This is just HTML for
some text in a box </span>
</DIV>
```

And images can be put on screen very easily...

```
<DIV STYLE="position: absolute; TOP:20px; LEFT:40px; WIDTH:200 HEIGHT:90px;" >
<IMG SRC="CV-Logo1.png">
</div>
```

Here the image is a PNG file which was chosen as it supports 8 bit alpha/key channel.

The great thing about HTML coding is that it can be typed into a simple text editor and then saved as a normal text file, but with the suffix .HTML on the end.

CSS3 (Cascaded Style Sheets version 3) is the technology that was introduced in web browsers to provide a template-like function for websites defining colours, fonts, positions and more recently animation, movements and transformation capability.

CSS3 provides a timeline-based programming capability allowing image or text objects to move around the screen with any number of moves and also to undertake 2D or 3D transformations.

While CSS3 is slightly more complex in its coding, it is so widely used that any web programmer will already be very knowledgeable about it.

The same is also true of JavaScript. JavaScript is a full programming language and is part of the reason that websites are now so powerful and flexible. It is through JavaScript that external data can be used to drive the text and graphics on screen.

Using general software solutions

Of course it is not necessary to understand the complexity of these coding technologies to start producing web graphics. There are many software packages available which can help you construct the HTML, CSS3 and JavaScript files.

One particularly powerful program is provided free by Google. The Google Web Designer (webdesigner.withgoogle.com) is a visual programming tool, which allows the user to bring in images and place text on screen by drag and drop.

There is a timeline function which then allows full animation of these media objects and an export function which will bundle up all these files to put on a web server in an easy manner.

Using broadcast-specific software solutions

There are many other programs and web tools available which may be used to construct sophisticated graphics – and in fact there are now some specific solutions targeted for broadcast use.

An example of this is Singular (www.singular.live).

SINGULAR.LIVE

This is a powerful, cloud-based software platform that allows you to create broadcast quality graphic overlays. You can use pre-built templates, professionally designed, for specific types of video content. For example, Singular has templates for football, basketball, athletics and so on. You can also design your own and link it to your data sources. It requires no programming knowledge and yet enables anyone to have the kind of graphics you would see from a top end

broadcaster. It runs in the cloud but provides a URL which then allows third-party products to connect to, for rendering on either another software platform or hardware installed in your facility.

Ways to add the graphics to video

As we have established there are a wide range of different options to produce high quality graphics using web technologies. The next step is to get these graphics on to your video content.

PC based software solutions

There are PC based software programs available now which allow you to perform the functions of a vision mixer with live video – such as Casper CG (www.casparcg.com), OBS (www.obsproject.com) and V-MIX (www.vmix.com). These have a wide range of functions for mixing video from different sources and also have the capability to use an HTML file with its associated assets to render and key graphics on to a live video signal.



These programs support a variety of SDI plugin cards and provide a great way to get up and running at a relatively low cost. This is ideal for smaller TV stations, web broadcasting and other one channel environments.

Hardware solutions

When it comes to multi-channel TV transmission facilities, it may not be ideal to use a big stack of PCs. That is where Crystal Vision's M-WEBKEY product may be more applicable.

The M-WEBKEY software app runs on Crystal Vision's MARBLE-V1 real-time media processing platform. This is a modular hardware product which supports uncompressed SDI and IP video (ST 2022 / ST 2110). At the heart is a powerful Quad core CPU and Nvidia GPU based technology.

The MARBLE-V1 cards are slotted into Crystal Vision's modular rack mounting frame system which allows up to ten cards to run in 3RU of rack space. This means there is a great saving to be made in terms of space and power efficiency for multi-channel systems.



MARBLE-V1 and Vision 3 frame

The M-WEBKEY incorporates a full HTML 5 web browser, supporting CSS3 and JavaScript. It will render its output at the correct frame rate and resolution as the incoming video. Also included is an internal keyer which then overlays the graphics on to the incoming video. The web-based content can be stored locally on the frame or accessed from anywhere on the internet, making it possible for the M-WEBKEY to form part of a distributed or remote production system.

The M-WEBKEY supports standard graphics formats with full support for alpha channels with PNG and GIF files, allowing transparency as well as supporting the associated animation capabilities of those file formats.

Being specifically targeted at broadcasters it offers the additional features that a broadcaster expects to have such as redundant power supplies, support for SNMP monitoring and control, as well as a choice of API interfaces through ASCII over Ethernet and JSON/HTTP.

Not running Windows also removes any worries about constant software updates and security patches.

Summary

Web technologies have unleashed a huge range of options for creating broadcast graphics and rendering them on to live video. They range from simple, no cost options up to high-end sophisticated multi-user, cloud-based systems. Whatever a broadcaster's application and budget, there is a possible solution.