HD And Beyond: A Look At Where Media Servers Are Going

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La Damnation de Faust at the Metropolitan Opera (Photo: Marty Sohl, Metropolitan Opera)

All servers are not created equal. Each media server embodies technical contributions that have made all media servers better, and the best server for the project is the one for which the user understands the capabilities and limitations. Fortunately, the world of media servers is very open-source. For example, Nigel Sadler from Green Hippo has welcomed every insane idea with, "Why yes, I'd love to help you win first place at the mad science fair!" The same can be said for Kevin P. Morris of coolux (http://www.coolux-inc.com/) (Pandoras Box), Matt Corke from PRG (http://www.prg.com/) (Mbox EXtreme), Ash Nehru of United Visual Artists (http://www.uva.co.uk/) (d3), Curtis Cox of Martin Professional (http://www.martin.com/) (Maxedia), and Jorge Moritz from e:cue (http://www.ecue.com/) .
There is also a growing network of independent users, self-supporting other media servers including Watchout (http://www.dataton.com/) , ArKaos (http://www.arkaos.net/) , Jitter (http://cycling74.com/products/maxmspjitter/) , and Isadora (http://www.troikatronix.com/isadora.html) , just to name a few. There are almost too many servers to mention, and that's a good thing.

As a side note, the benchmark resolution for discussion in this article is 1920x1080p 30fps at 24kbps constant bit rate, 16x9 aspect ratio, sometimes called 2K, and *not* the 4x3 aspect ratio 1024x768 version of HD. Some of the media servers mentioned here can output up to 4K, and at least one has no resolution restrictions at all. However, at that resolution, you will get only one layer of playback utilizing a modified clip of some sort. What's great is that multiple servers with custom media can be ganged together to get up in the millions of pixels range, even in 3D. A good example of this is the Comcast Center in Philadelphia, designed by David Niles of Niles Creative.

As server utilization has become common practice, we have become pixel-hungry. SD has begun a death rattle, and HD is becoming the standard. HD has been a part of my daily routine since Disney's *The Little Mermaid* on Broadway in 2007 (http://livedesignonline.com/theatre/splash_color/index.html) , where we utilized Green Hippo's (http://www.green-hippo.com/) Hippotizer HD media servers. Since then, our use of servers

outputting 1920x1080 HD has grown to include coolux's Pandoras Box and PRG's Mbox EXtreme, and I hope to include more in the near future. As for what is "El Server Supreme," it's virtually impossible for one to claim that status, as they are all different, and all have different applied sciences, which make them right or wrong for any given project. As always, there will be preferred servers. My current server utilization includes two servers of different pedigree to get the desired effect.

Which Server?

In formulating your own decision on what server to use, bear in mind the limitations of each. For instance, what's the max number of layers or stills a server can playback before system performance noticeably diminishes? The common misconception is that an HD still doesn't take any processing power because it's a still. The truth is that most servers are only resolution-aware. HD stills or HD clips are the same to the server, because they are the same resolution. The server treats them both as HD and, therefore, consumes more system resources.

Another common misconception about HD is that it is unlimited. HD playback can be measured in the strength of the graphics card or processor. Windows-based servers, such as the Hippotizer or Pandoras Box, have the option of writing custom decoders for their preferred video cards, meaning most PC servers rely more heavily on the graphics card. Mac-based servers, like the Mbox EXtreme, rely on the processor.

How each server deals with clip-loading and decoding of clips will govern your programming. Plan on making several different test clips at different bit rates until you land on one that gives you acceptable output quality and playback capabilities. You shouldn't blame the server if you overload it. For example, two to three 30-second HD loops can play, while other times only one giganto 30-minute clip will play. Some servers have error logs that can tell us at what point we started to overload a server. Pandoras Box has an excellent error log. While reading it, you can find exactly the moment you've begun stressing or crashed the server and what clip took you over the edge. If you receive what we like to call "jackpot," the log basically reads, "Congratulations, you have crashed the server," with "jackpot" defined as: "A system resource strain that accumulates until a release of all system resources happens, resulting in a jackpot error message."Used in a sentence: "Holy f@#k, *jackpot*!"

Green Hippo has a live status tab where you can actually monitor your graphics card's health by frame rate and available RAM, including a log that keeps track of everything affecting the server's health, and you can monitor while programming and running back cues. HD programming requires responsibility, and you have to be prepared for a shell game of utilizing system resources to avoid the dreaded jackpot error message.

So, are you feeling lucky? Or are you ready to do some homework? On the east coast in New York City's SoHo, you have the very helpful XL Video LED Lab, kind of the neutral ground for current, emerging, and future technologies like the UVA d3 server platform. On Long Island, you have AG Light and Sound, and in New Jersey, there's Scharff Weisberg. If you don't live in the tri-state area, you can always rely on TMB, as those guys have ongoing training for Green Hippo all over the country. The same can be said for coolux's Pandoras Box and PRG's Mbox EXtreme. In Chicago, Dunaway Designs and Upstaging have a great selection of servers in their studios. All you have to do is look up your local video or lighting vendor.

Before beginning a project in HD, you need to ask yourself the following questions:
• Why do you want to use HD?
• Will your project actually look good in HD?
• What do you expect to do with the server?
• What server, or combination of servers, can complete the whole project?
• If you're pixel-mapping an 800-pixel wide by 100-pixel tall LED surface, do you really need HD?
• Are you pixel-pushing just to be cool?

Servers have become much more than just DMX-controlled clip or DVD players. Media servers are living pieces of the entire design. Currently, there seem to be two worlds of server programming. The first is prebaking media in the bat cave and then utilizing the server as playback only, with no effects. The second is the building-block method, using the server as a live compositing, layer-based system. The programmer edits these elements the same way a non-linear editor/effects/colorist would do in motion picture production. The major difference with live compositing is that we can edit and playback in realtime, with multiple clips as building blocks. Color changes, speed changes, even live effects or edge blend changes over time, just to name a few, can be employed. Designers, directors, and artists can ask for a change, and they can receive it almost before they are finished asking for it. In the prebake-in-the-bat-cave method, if a change is requested, you have to reedit the entire piece and then render a new complete clip. These are choices that depend on each designer's style, and either will get the job done.

Some systems employ a single server, single output. Others employ multiple-server platforms that interact with each other via live controls for VJ takeover. We did this for WES 2009 in Orlando, with Hartmann Studios' production designer Greg Sullivan. Sullivan controlled four layers of a Hippo (in dual-output mode) and used an ArKaos setup, VJ-style, and I employed an MA Lighting grandMA (http://www.malighting.com/) to run the other half of the Hippo, while screen-thieving the ArKaos output, featuring a live performance by Will.I.Am. Thanks to Sullivan's incorporation of VJ-style and his production design savvy, the attendees were completely blown away. Further complexity can rear its head in the form of MIDI sync, DMX control, full-interaction of multiple users in different locations, or some variety of motion-tracking. The list goes on and on. We call it "mad science."

Next Page: Navigating The Process

1 2 (http://livedesignonline.com/theatre/0406-media-servers-going/index1.html) Next> (http://livedesignonline.com/theatre/0406-media-servers-going/index1.html)

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