

VYV and Photon Media Server

By: Richard Cadena

I go to a lot of trade shows because they are great places to learn about new products and companies, and to meet new industry friends while seeing old ones. Because of that, I thought I knew at least a little bit about most or all of the media servers and media server developers in the industry. But there's always more to learn.

A friend recently posted a question on Facebook asking about the future of media servers, and one of the answers caught me by surprise. It was simply a link to a company based in Montreal, Canada called VYV.

If you've recently worked with Ariana Grande, Roger Waters, Mariah Carey, Adele, Simply Red, Miley Cyrus, Justin Timberlake, or Britney Spears, or if you work with Cirque du Soleil, Franco Dragone, or any number of other companies, you probably know VYV and its flagship media server Photon. You might even have worked side-by-side with them on some of these shows. Otherwise, you might be wondering, like me, how a company working on such high-profile shows can fly under the radar for so long.

"We're almost never at trade shows," says Eric Plante, VYV's general manager. "At first, it was because we were very much project-based, and, over the years, there's been a lot of word of mouth. It used to be mostly video directors or lighting designers, and they're still an important source of projects; over the years, there have also been integrators who have decided to use Photon as their main solution."

VYV, which has been around for about 13 years, has quite a history in the industry. it was started by Emric Epstein and Martin Granger-Piché, who were friends since their days at l'Université de Montreal. They got their entry into the entertainment industry by working with Cirque du Soleil on *Bar du bout du monde* in 2004, *Torrida Grand Prix Party* in 2005, and *Delirium* in 2005 and 2006. In the process, they developed the media server that became Photon.

Photon is described by the company as an all-in-one media server that includes compositing, editing, 3-D rendering, playback, effects, tracking, and much more. If you think it sounds a lot like any other high-end media server but with added integrated tracking and effects, then you and I think much alike, because that was

VYV Photon.

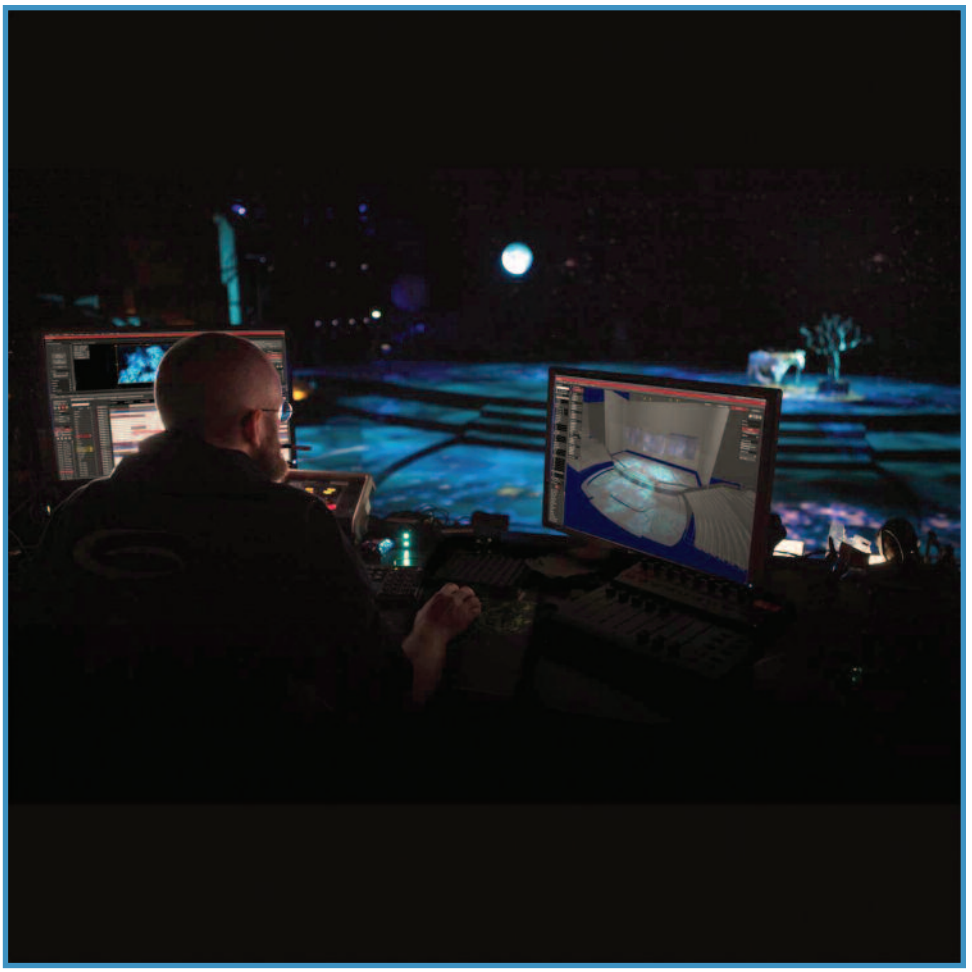
my first impression. And I wondered how the company could have managed to get so many high-profile clients by word of mouth. Plante explains it in a way that makes sense to me: It's due in part to the speed at which they can calibrate cameras and projectors, and in part to the fact that their signal is uncompressed.

"We have a system called VYV Constellation whereby we drop lines from the grid and you press a button, and the cameras calibrate very quickly," he says. There are other ways to calibrate the system but this, he says, is a convenient way of doing it. Other systems, he said, use a system known as "wanding."

"(It) involves moving a wand through the space, and that operation is proportional to the size of your space. It's fine for a motion-capture studio where you do this once a month or once every three months. But if you're on a tour, you need to do it every morning in a new venue, and because the stage is typically much, much larger than a mo-cap studio, it can take anywhere from 30 minutes to two, three, or four hours."

He cited one show in which the calibration process took over four hours because of the "gigantic space." Calibrating Albion, Photon's tracking system, he says, is instantaneous.

"When that's done," he adds, "cameras are calibrated and projectors project white patterns. That takes about 10 seconds per projector. For instance, last August we did Singapore National Day. It was in a football stadium, or what Americans call a soccer stadium, and in that space we had a floating city made of pieces of cloth that were suspended by cable. The whole motion-capture volume was about 60m' (about 180') by 60m by 25m high (about 75'). We had about 75 projectors, and the whole process of calibrating cameras and projectors would take 55 minutes. Whereas, the previous year, calibration had been done manually with another system, and that project wasn't projecting on objects—it was just floor projections that covered the whole stadium. That took a few days to calibrate."



Photon at work on a production.

The calibration process, he says, is not just a "novelty" and it's not "an R&D demonstration;" it's what is done on every show. In addition to saving time, it also "opens up possibilities."

"We did this on Justin Timberlake's tour in 2013. That was 33 or 35 projectors, and, if you don't have automatic calibration, you can't do that on a tour that has back-to-back shows. So it's not just a question of saving time, it's a question of doing things that weren't possible before."

Another feature of Photon that differentiates it from its competition is the way it handles video compression, or the lack thereof.

"Photon is used almost exclusively…probably 100% exclusively uncompressed," Plante says. "There's no spatial compression and no temporal compression on playback at all in Photon."

He goes on to explain the differences between VYV's system and others that use the popular HAPQ compression algorithm. Plante, who once was a software developer in the gaming industry, says that HAPQ, like all spatial compression algorithms, looks good "in most cases." But, he says, if you have very high-frequency images—he uses the example of filming sun shining through leaves—you're going to have a lot of issues with fine details. Another issue specific to HAPQ is when you have a smooth gradient; HAPQ is "based on blocks," and the blocks tend to show.

"The other thing that's nice with

uncompressed [video] is that frames are always a fixed size, and the order in which you read from doesn't matter," he adds. "HAPQ does that well, but other algorithms have trouble with that." This makes for more consistent playback, allows different frame rates to be used, and allows smoother slow-motion playback with automatic frame-blending.

Many other features keep this media server in high demand. The system was designed to work in a 3-D environment from the ground up, "so projectors are always aligned in three dimensions," Plante says.

"The calibration process recovers position, orientation, lens shift, zoom value, and lens distortion correctly for each projector. We have our own tracking system that's designed specifically for shows, and we have our own effects system that's built in as well. And these things are built into the system so they can very easily talk to each other. You don't just use tracking to project on moving surfaces, although you can do that. You can project on deforming surfaces, or you can use tracking for interactive effects. In fact, you can use tracking to change any parameter, and the fact that they're integrated makes that easier."

Plante says that most of VYV's projects that walk through the door are uncontested. He figures that this has a lot to do with how the company's media server is differentiated on the market. "They're coming to us because we're the only solution that's possible for what they're trying to do."

Tom Burford, technical development manager for Creative Technology Ltd. in London, agrees. "From a technical view, I like the system's stability, its scalability, and its performance," he says. "From an operational point of view, what is great about Photon is [that] it is a true one-for-one representation of the physical world in the virtual world. This means that anything that you can represent digitally with a mesh you can map video onto. And as the technology moves forward, there will be fewer and fewer things that we can't do."

In addition to the Photon media server, VYV also offers the Albion 3-D tracking system and dual-head video controller for Photon systems; the Xenon, which is a "pared-down version of Photon" for permanent installations; and the brand-new Tachyon, which is an inexpensive, pared-down version of Photon in an Android app. In addition, VYV developed PosiStageNet, which is used in grandMA2 lighting consoles and Hippotizer V4 media servers, to do 3-D tracking. For more information about all of these products, visit www.vyv.ca.