Pulling out the Stops

How Crestron brainstormed and built its new ADMS Intermedia Delivery System.

By Don Kreski

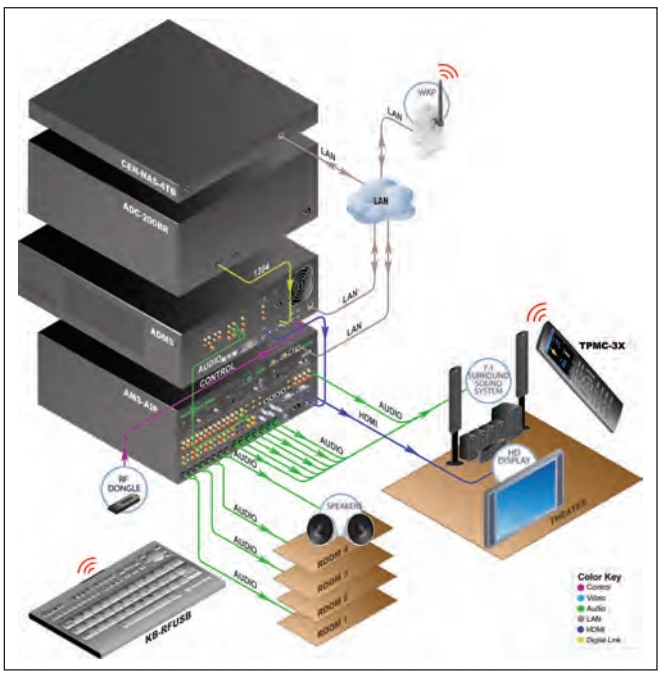
If you had the time, money and resources to build the ultimate home entertainment product, what would it be? I'd like to create a device that pulls together the best movies, music, sports, as well as on-air, on-demand and online programming. And I'd like to have all this at my fingertips, with, of course, the ability to access the Internet. In addition, I'd want to be able to do all of this from my sofa or from my kitchen TV—I don't want to be forced to do this from my home office. I spend all day in front of my computer, so I want to get away from it when I'm not working.

It turns out that the engineers at Crestron read my mind about two-and-a-half years ago—before I even had an inkling of what kind of gadget I'd design if I could. The result: Creston's ADMS Intermedia Delivery System, which hit the market in December. The story of how it came together should be of interest to anyone who's ever dreamed of inventing a new product.

"We started with a simple idea," says John Pavlik, Crestron's senior marketing and development engineer. "Two or three of us got together with the goal of updating our Adagio Audio Server, and we began talking about what a media server should be."

At first, the group focused on existing technology, but they soon realized they weren't getting anywhere. "So we went back to basics," Pavlik says. "We went to a white board and started listing where content comes from—your cable box, satellite TV, Blue-ray discs and online. We then said, 'Let's suppose we had computers hooked up to our TVs. What are the top things we would want to do?'" You might wonder why a group of Crestron engineers would even think about taking on a project like this.

Best known for its control systems and its ability to interface with other manufacturers' products, Crestron is also renowned for integrating its products with many different media systems. "But we have always found the experience somewhat lacking in one way or another—not being fully in control of the entire environment," Pavlik adds. "We realized that if we were going to try to build this kind of media system, it was going to be a tall order. And that was a good thing. There is no point in putting together another 'me, too' product."



A deconstruction of the Crestron ADMS Intermedia Delivery System's many parts.

The first year of the development was all about defining what the media server should be. This included a lot of brainstorming, discussion and due diligence—and observing how the design team, and its families and friends, used A/V media.

By and large, the project's "hamsters" were happy with the experience of watching television, Pavlik says. While they didn't necessarily express a desire to change that experience, they were open to enhancing the experience. "We all had [holiday] stories of holidays when someone would want to watch a YouTube video, and so a dozen people would crowd around a lap-

Fred Bargetzi (left), VP of technology; John Pavlik (right), senior marketing and development engineer.

top to look at a clip that they all thought was hilarious."

Fred Bargetzi, Crestron's vice president of technology, relayed an experience that drove the design of what became Crestron's ADMS WorldSearch, a revolutionary media search engine. "At home," Bargetzi explains, "I have Verizon FIOS, a 200-disc DVD carousel, AppleTV, Vudu, and an Xbox 360. Recently, my daughter asked me if we could watch a Harry Potter movie.

"Feeling confident that I had more content at my fingertips than most, I knew I could deliver," Bargetzi continues. "I started with On Demand from FIOS, and after a few minutes of search came up empty. Then I moved on to AppleTV, then to Vudu, then finally to the Xbox." After more than 15 minutes of scrambling, Bargetzi was stumped. "Needless to say, my daughter departed with a 'thanks for nothing' look and I was equally as frustrated. It turns out that I actually had the movie in my 200-disc carousel."

That real-life experience begged the question: Why should a user have to search in multiple places to find the content he or she is looking for?

Another important moment was when Bargetzi toyed with the idea of looking for a used Porsche 911. "Obviously he could do a Google search on his laptop," Pavlik says, "but how great would it be if he could sit back in his media room and say, 'I was wondering about such and such,' key it into the television remote and find [the information] addressing his question [pop up on his TV screen]?"

MULTIPLE SEARCH MODES

These discussions became the catalyst for Crestron's ADMS WorldSearch feature: Just type in a title or a key phrase and the system locates the media you're looking for. "We envisioned a system that would return, first of all, what's in your own library, then what's in the higher-quality on-demand services, and finally what's on the free sites, such as YouTube," Pavlik continues. "We [designed] it [to work] this way because we recognize who our customer base is—people who are interested in quality things. So there's a premium placed on the better services. That being said, a lot of what's free is useful and hard to get anywhere else."

In addition to WorldSearch, the team felt they needed to devise a simple way to browse through a user's media library and subscription services. "If you feel like watching something but you don't know what, you should be able to look around without having to think too much about where an item might be located, Pavlik says. "Our video library application lets you find a title [and it allows you to] play it as well." The application includes a video store in which users can browse media that's available online. "We designed a way to select the movies you want and have them download later. So when you're ready to sit down, you can watch them without having to wait."

At this point, the design team, which included three engineers, had expanded to seven. The team also was consulting with other professionals—both inside and outside the company. "It was lots of conversations and lots of sitting around a white board, making lists of things the product might do," Pavlik

The Specs:

- List price: $9,000
- High-performance digital media server
- Onboard optical drive plays Blu-ray discs, BD-Live discs, DVDs and recorded DVDs
- Custom, secure web browser locked down to prevent spyware/viruses
- Exclusive WorldSearch feature searches home library and online media sources concurrently
- Embedded Video On Demand, including online purchases
- Versatile music and video library browsing displays album/DVD art and other information
- Three outputs: home theater zone (video and surround sound, expandable) plus two stereo audio outputs
- CDs imported at 20X normal playback
- Plays Windows Media, iTunes Plus, MP3, FLAC, WAV, WMA, AIFF, ALAC, and AAC audio formats
- Plays MPEG-2, MPEG-4, H.264, WMV, QuickTime, Flash, AVI, and M2TS HD Camcorder video formats
- 1 TB internal storage for media files; RAID 1 (mirrored) data loss-prevention technology; expandable using external hard drives, NAS, or Windows Home Server
- High-quality HDMI, S/PDIF, and component outputs
- High-definition 1080p video, and 7.1 surround-sound outputs
- Upscales SD, 480p DVDs and web content to match your HD display
- Gigabit ethernet connectivity
- Media Transport Wizard for fast import of iTunes Plus and other music files
- Custom audio board with 105dB SNR 24-bit 96kHz audiophile sound quality
- Hard drives optimized for video streaming
- Onscreen user interface with home control capability
- Full touchpanel browsing and control from any room
- Crestron SystemBuilder support
- Integrates media and home control
- Displays personal photos as a screensaver
- Supports M2TS format from HD video cameras
- Designed for cool, quiet, robust operation; rated for "in-room residential installation"
- Crestron Watchdog hardware system monitor
- Remote access for real-time Crestron customer support
- 3-space, 19-inch rack-mountable

says. As they worked out the details of the new server, they began writing software and building a prototype.

Once the design team devised a working WorldSearch, they debated about whether a full Internet browser was necessary. "There are a lot of things that are very easy to do on a PC—[things that] become much more difficult when you're only using a remote control," Pavlik says.

Jason Oster, Crestron's residential A/V product line manager, wondered whether a web browser was necessary.

"He came in one day and said his mom was graduating with a master's degree in his hometown in Kansas, but he wasn't able to go [to the graduation]," Pavlik says. "So we set up the family with our ADMS prototype and they watched the graduation as it was streaming live over the Internet. You can't get that experience from YouTube."

With the graduation ceremony displayed on a large-screen LCD TV instead of a laptop, the family's 1-year-old was able to see Oster's mom in the crowd when she waved. "The baby responded with a wave and said, 'I'm waving at Grandma.'"

The team then devised a web browser that was accessible with a handheld Crestron remote; the remote could also display any web page on a TV. "We worked hard to build easy-to-use zoom buttons so you could read small text across the room," Pavlik continues. "We also created a touchscreen keyboard and a 'favorites' menu for our handheld remote control. Of course you can use a [computer] keyboard with it, but even if you don't it works well."

A NEW MUSIC SERVER

While designing the system's music library, the team realized that most music servers were becoming obsolete, thanks to the Apple iPod. "We needed to offer a place to collect and play your music, but nearly everyone is carrying a music server with them [via an iPod]," Pavlik says. "We needed a rock-solid music experience."

TIVO became the catalyst for the next step. "Not that we took any specific navigation features out of it, but when you use a TIVO, you understand where you're supposed to go and what you're supposed to do. When you push a [specific] button, you understand what's going to happen. "

The ADMS Intermedia Delivery System

Other new features were also borne out of those never-ending brainstorming sessions, one of which includes an "audition" feature. Pavlik describes it this way: Say you're making a playlist while, of course, listening to your favorite music. Suddenly, you come across a song that you only slightly remember. The audition feature allows you to select that song, click the "preview" option and hear it on demand. When you select the "stop" button, or when the song wraps up, the system reverts to the song you were listening to previously.

Another application is the ADMS Home—a place where installers can create custom user pages to control the various automated features of the home, such as lighting, HVAC or security. "We didn't intend this to replace a control keypad—you don't want to have to turn on your TV before you can turn on your lights or adjust the [HVAC]," Pavlik says. "If you're watching TV and want to [change the] lighting, you shouldn't have to [use] another controller."

BUILDING THE SYSTEM

By the end of that first year of development, most of the engineering work was complete. The team brought its prototype to the 2008 CEDIA trade show.

Because the team designed its own user interface and web browser, which doesn't resemble what you'd find on a PC, very few people realized that the prototype was essentially a personal computer that used a custom installation of Windows Vista. The difference was that it was a locked down version that users couldn't change, customize or add to. By locking down Vista, the team sped up and stabilized the ADMS. greatly reducing the chance that Vista, World Search or applications wold crash. (Microsoft offers the ability to create custom applications of its operating systems to encourage developers to license them for closed systems, such as ADMS).

"Microsoft gave us a lot of help in creating this," Pavlik says. "Locking it down gave us a fast, stable platform for what we wanted to do.

"Taking it to CEDIA," Pavlik adds, "was a great opportunity to show people what we had done and to see how they reacted—what they [did and didn't] understand."

In addition to the 2008 exposure, the team started showing its creation to select visitors at Crestron's national headquarters. The team also built a dozen prototypes to test inside and outside Crestron.

Next, the team changed the user interface and built a prototype for the ADMS hardware. The finished unit debuted at CEDIA 2009; pre-production units were tested for three more months.

"I definitely thought our 2008 prototype was a high-school science project compared to the master's thesis we built in 2009," Pavlik explains. "It was very much in our mindset that it had to be something so easy to use—that a guest could pick up a remote and find what he wanted without any training. We changed the entire interface to make it easier to understand."

And the end result? Well, you'll want to judge it for yourself. After the early prototype won CEDIA's 2008 "Best Future Product" award, the more refined version was named "Best Media Server" by *CE Pro* at CEDIA 2009. It also was named "Best Video Component" by Innovations International at CES 2010. For more information, visit crestron.com or call 800.237.2041. ●

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