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Going tapeless -- postproduction's latest evolution

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"In Treatment"

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When "In Treatment" co-producer Jim Hilton was looking for a place to post the new HBO series, going tapeless was not a consideration. But then PostWorks Los Angeles executives described a post workflow that would eliminate multiple videotape masters for each episode. Hilton, a self-described "old-school film guy," says the idea took a moment to sink in.

Then he jumped at the opportunity.

"The huge number of episodes on this series and the ever-changing and evolving nature of a first-season show made the choice of working at a facility committed to a pure data workflow easy," Hilton says. "Forty-three episodes are a lot of juggle, and it started to make a lot of sense not to have 43 tape masters, 43 submasters and so on. I realized data was our friend."

Since the invention of videotape, postproduction has lived through dozens of videotape formats, each new one forcing post houses to buy new generations of tools and videotape recorders. Now, TV producers have caught a whiff of the tapeless way of doing things -- and they're liking the experience. "First and foremost, we saved time," Hilton says. "And we saved thousands of dollars in the videotape masters we didn't have to duplicate."

Post houses began instituting tapeless processes in the 1980s, but the limitations of storage and bandwidth made it impractical for anything but audio's small file sizes.

"Data-centricity first crept into the workflow in audio because the frame size is smaller," says LaserPacific Media Corp. president Leon Silverman.

The next step, he continues, was Cineon, a combination of hardware and software that transformed film into digital files for visual effects work -- a process that formed the foundation of digital intermediate, or DI.

"The DI is what really started the tapeless workflow for us, in midstream of the content's life cycle," says Technicolor Content Services president Ahmad Ouri. "From using DI for the nucleus of the tapeless workflow, we're looking downstream to mastering (digital cinema) and even further downstream, to Blu-ray compression and authoring."

Moving data-centricity from an island to a workflow, however, has its challenges. One of the main obstacles is the cost and speed of storage. PostWorks Los Angeles president Mike Doggett, who had the advantage of building a tapeless facility from scratch without having to amortize or work around old equipment, notes that opening up a tapeless facility is not cheap. "When you're talking about storage, you're swapping tape machines for high-speed storage, which is certainly coming down in price, but isn't a commodity yet."

Ascent Media Creative Services chief technology officer Phil Mendelson explains why: "Entertainment TV means a lot of storage. Despite the fact that it's been continually dropping in price, it's still expensive." Though one terabyte that went for \$30,000 five years ago can now be had for \$10,000, even that precipitous drop in price doesn't translate to affordability for the post house that's working on multiple TV shows. "It's easy to model out what it takes to do one TV show," Mendelson says. "Not quite as easy to grasp what it takes to do 10 TV shows, with five episodes of each cycling through the facility."

While storage has held back data-centricity, the appearance of high-resolution digital cameras is pushing it forward. The CW's "Everybody Hates Chris," for example, shoots with the Thomson Viper and gets a tapeless workflow at DigitalFilm Tree. "Once you're working with file-based acquisition from a digital camera, it's certainly of great benefit not to support a large VTR infrastructure," Mendelson says.

But digital cameras that record data (among them the RED digital camera and the Silicon Imaging MegaCamera) have their own problems. According to FotoKem chief technology officer Paul Chapman, the data-based workflow falls "off a cliff when we try to deal with some of the digital cameras out there that record to data. You might have a few minutes worth of material, and it could take hours to ingest it and prep it for editorial. The amount of data they generate is getting astronomical ... and who pays to store that?"

Ironically, the tapeless workflow doesn't eliminate the need for tape. "What's amusing is that you end up with a large number of LTO-3 tapes, which are big, for archiving," says Post Logic Studios vp software engineering Denis LeConte. "Because people feel more comfortable shooting more, you end up with hundreds of these tapes."

Despite all of those not inconsiderable obstacles, the momentum is growing to adopt the data-centric workflow. "The biggest benefit for TV producers is turnaround time and the lack of having to make copies of various shows, whether it's approvals or versioning,"

Technicolor's Ouri says.

Another huge benefit is concurrency, or the ability of multiple artists to work on the same footage at the same time. MTI Control Dailies system, which Ascent Media helped pioneer, allows concurrency in the workflow. "Everyone else concentrated on data management, and the colorist could just color," Mendelson says.

Some productions are already a natural for the tapeless workflow. Electric Pictures Solutions president and CEO David Pincus notes that "tapeless workflow seems to be more prevalent in the unscripted area," because the productions use lower-resolution digital cameras and shoot huge amounts of footage.

In addition to reality TV, FotoKem senior vp Rand Gladden points out that another kind of production is a perfect fit for tapeless postproduction: animation. FotoKem has provided a tapeless workflow for "Slacker Cats" and "Wow! Wow! Wubbzy!" two animated series produced by Starz Media/Film Roman.

"It's animated in Korea, comes to us via data over a fiber network, is put on a drive, goes to the client, who does their offline edit," he says. "Then it comes back to us, we conform the original data, color-correct it, title it and it goes onto a piece of tape. It's a natural way for animators to work, since animation is on a computer platform and it's much easier for them to output sequences of files."

Post experts predict that the tapeless workflow will predominate over the next two to five years. But for that to happen, certain things have to fall into place. In addition to cheaper storage and faster pipelines, everyone involved wants to see standardization.

"Now you have multiple media formats for video, audio and metadata, compression at different levels," says Autodesk TV industry manager Bruno Sargeant. "And there is an increasing number of formats; before hardware can embrace the throughput and bandwidth requirements, new formats emerge. We'd benefit from standardization."

At Post Logic Studios, LeConte describes how, right now, "there is always a big discussion at the beginning, to set up a workflow. It's a bit of a new frontier at this point," he says. "We'll see some amount of standardization, so at some point tapeless workflow will start to converge toward a limited set of solutions."

Finally, TV producers, studios and networks have to be ready to take the leap. "It's fair to say that the studio environment isn't yet comfortable working in a tapeless process all the way through," Gladden says. "It requires a completely different mindset, and it takes time for our industry to get its mind around it. When it does, it'll be comparable to the transition from linear to nonlinear editing."

As an increasing number of TV productions embrace the tapeless workflow, however, experience will help iron out the significant kinks so that each production doesn't reinvent the workflow. "Data-centricity is the next natural step of our evolution," Silverman says. "While we're increasingly moving to data-centric workflows in our industry, there is still a great deal of

immaturity with regard to simplicity, archiving and interoperability. It's a challenge to make data-centricity as elegant as the traditions of postproduction in our past."

When data-centric post becomes a widespread reality, that might well signal the end of endless iterations of VTR. But post executives doubt that it'll be the end of change in an industry defined by it. "We'll see 3-D TV coming along, and we'll have to deal with that," Gladden says. "There'll be processes relating to Internet productions and interactive TV. I see no end to the evolution of post."

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