

Guiding video workflow

Video workflow management in an IT-based environment is more than just making data available.

BY JOHN PALLETT

The migration to IT is not unique to the video industry. Hundreds of industries — from automotive manufacturing to financial services to warehousing — have made this transition. Now that almost every device in the video ecosystem supports IT-based data exchange, it is tempting to suggest that the video industry has made that transition as well.

However, there is a difference between making data available and allowing the process design and management necessary to truly leverage IT. When warehouse records moved into the database, it took ERP solutions to build processes around that data before warehousing was able to find true value in IT. While many operational departments within video companies — such as finance, traffic and billing, and sales — already use IT-based solutions to manage both their data and processes, the guts of the video industry have still not truly transitioned to IT.

Specifically, the processes that surround the actual content are still evolving in support for IT-based management and control. Despite the increasing support for IT-based video infrastructure, it is nevertheless a ma-

These video workflows are different from a business-centric or data-centric process, which primarily concerns itself with business rules, and the manipulation of business records in a database. Such business processes

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major effort to design, implement, automate and manage video processes. (See Figure 1 on page 14.)

What type of process is lagging behind? For our purposes, a video workflow is a content-centric process that creates, acquires, modifies or deploys video media assets and supporting metadata. Such processes can be found in news production, spot management, post production, and virtually any other business that creates and manages video.

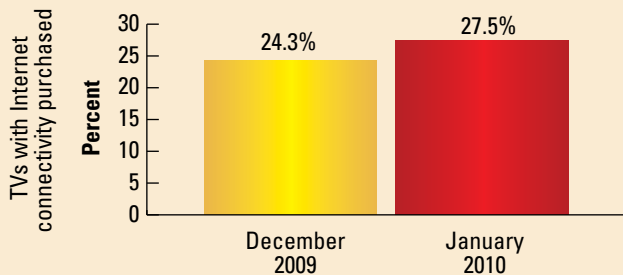
may in fact involve media — the business process of creating a report for an advertising client may involve a proxy of last year's spot — but generally the primary goal of such business processes is not the management of the media itself. And in fact, such business processes are well-addressed by IT-based tools such as SOA middleware. So why can't the same be said for video workflows? And who cares?

A lot of people care. The number of IT-based video workflows is on the rise, largely because of two driving forces. First, as revenues from traditional distribution channels decline, content owners and broadcasters are forced to support more distribution channels — often IT-based Web and mobile channels that require new workflows. Second, competitive pressure and the economy have led to cost-reduction and centralization efforts — creating even more need for IT-based workflow automation as headcount is replaced by servers and as redundant work is consolidated at low-cost operations centers. The net result of these forces is that video operations managers and station engineers must design, implement and manage more video workflows with fewer people. And in doing so, vari-

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In January, 27.5 percent of TVs bought in the United States featured Internet connectivity compared with 24.3 percent in December.



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ous approaches to managing those workflows have appeared.

What makes video workflows unique?

To explore the advantages and disadvantages of each approach, it is best to start by looking at some of the unique characteristics of video workflows. What makes video different?

- *Video workflows tend to involve multiple versions of content.* Most video workflows involve numerous versions of some original footage. Content versions may be in different locations, in different file formats, or treated for different formats and different distribution channels. It is not enough to simply create these versions; they must be linked, tracked and process design must allow the use of different versions at different stages of the course.
- *Video processes tend to change frequently — yearly, monthly, even weekly.* Video operations teams have

always been under pressure to be flexible. Whether supporting new distribution channels, new advertising customer requests or changing deadlines, there are always opportunities for process changes.

- *Video processes tend to involve large, metadata-heavy assets and CPU-intensive processing.* Process steps that

in a video workflow require more than just a video file. Systems often require advertising information, scheduling instructions, rights permissions and other content metadata before they know what to do.

Further compounding the complexity, another type of metadata — process metadata — is becoming

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modify, analyze, capture or play video tend to be fairly CPU- and storage-intensive. As a result, multiserver load-balancing and storage management are often necessary.

- *Video processes tend to involve highly interdependent steps and systems.* Many of the typical steps and systems

common as individual components become more focused upon their individual task. For example, what use is detecting macro-blocking artifacts if the time code of the error is lost? What value is automatic curtain detection if the curtains cannot be cropped downstream using the result of analysis?

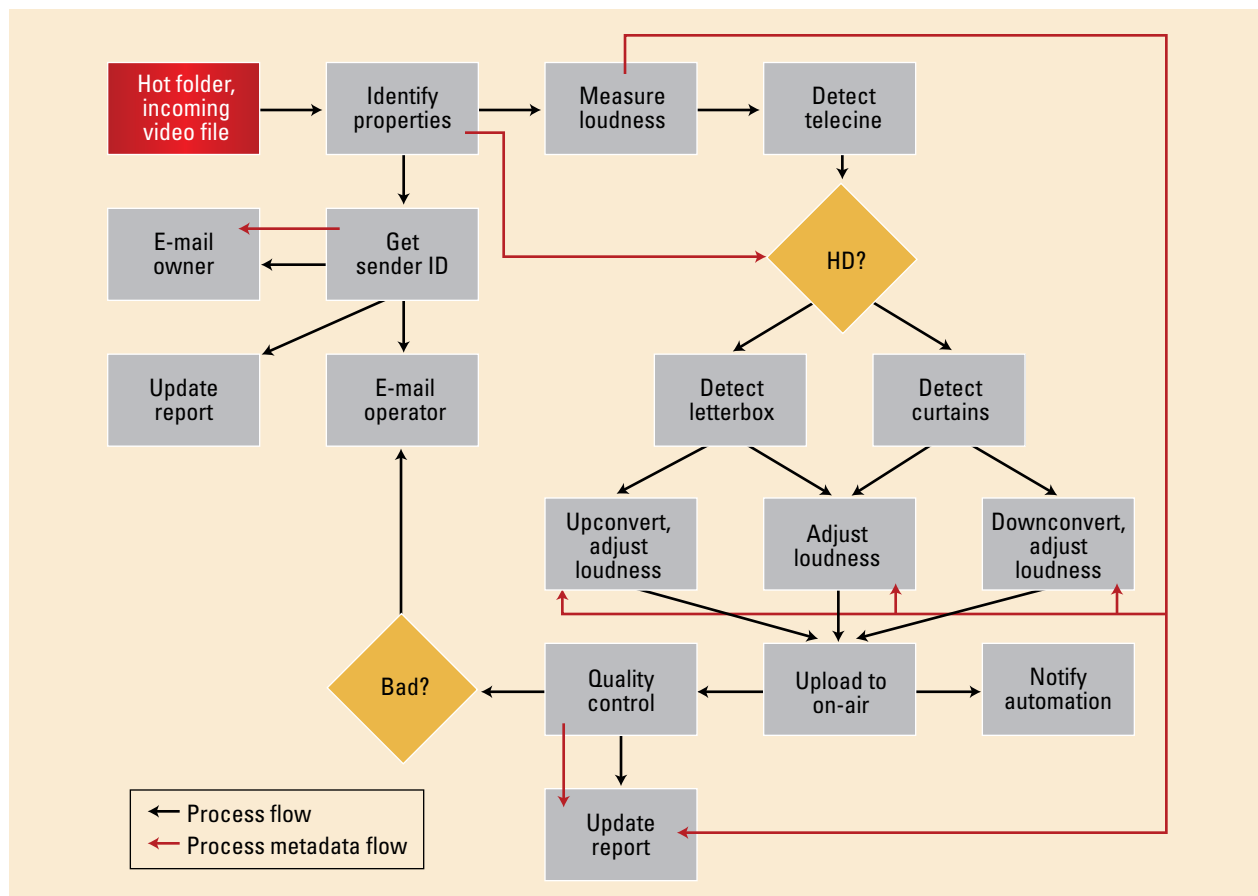


Figure 1. As seen in this real-world example, a video workflow can be quite complex.

Traditional approaches to managing video workflow

Traditional ways of managing video workflow include:

- *Digital asset management.* Digital Asset Management (DAM) tools tend to be good at managing large, metadata-heavy assets; they excel at searching and indexing metadata, and at managing storage.

Although DAM systems have added some rudimentary process design tools over the last few years, more sophisticated processes usually involve custom engineering or system integration. DAM systems do not natively preserve video-specific data types in a way that facilitates process design. Finally, DAM systems usually rely upon

their own data interchange. As a result, middleware approaches will typically rely upon file format standards such as Adobe XMP or MXF to pass information between process steps.

Further, middleware generally expects that action within the process be fairly transactional. Load-balancing and failover becomes the responsibility of underlying components. Middleware also does not generally provide for the management and execution of 24/7 services.

- *Transcoding solutions.* Video process design tools can often be found as part of transcoding and multi-channel distribution solutions. Such tools are easy to use, and have strong integration between process steps — allowing

perform the work required for interoperability. While MXF and BXF provide a vehicle for vendors to work together, the fully described workflow support within BXF and MXF is narrow and mandates a particular operating model. The reason for this is straightforward — it is up to the participating vendors to actually implement the process; and vendors cannot implement every possible process, nor can standards committees think of every possible use case.

As a result, when the workflow extends beyond the specifics of the standard, attempts are made to extend it. Specific implementations of the standard are proposed, and vendors are convinced to support the implementation, but this very method of implementing the process is the antithesis of flexibility. In the end, the standard works well as a requirements document, but the burden of workflow automation gets shared between participating vendors, and flexibility is difficult to achieve.

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third-party components to handle 24/7 reliability and load-balancing for mission-critical operations.

- *IT middleware.* Middleware is software that allows the combination of software components to execute processes. There are dozens of generic IT middleware solutions on the market today. The capabilities of middleware vary. Some allow visual process design, some enable integrations with third-party components using SOAP, and others require system integration. In most cases, however, middleware is flexible and does not prescribe a particular operating model.

However, while middleware generally allows process design and management for business processes, they tend to lack core capabilities for managing content-centric processes such as video workflows.

For example, while middleware may allow data exchange between third-party components, it typically does not support data types necessary for video (such as time code), and relies upon underlying components to perform

the management of multiple content versions and the passing of process-required metadata between steps. They also generally handle load-balancing and 24/7 uptime as needed for the processes that they support, and many of them allow process design “out of the box” at a reasonable price point. However, such tools often come with the caveat that “You can have any process that you want ... as long as it involves transcoding.” This ultimately can result in a mandated operational model, which may not be desirable for flexible video workflow design.

Standards-based approach to workflow management

Where systems need to interoperate, standards such as MXF and BXF have been proposed as an interoperability platform. The goal of such standards is typically to provide some degree of information interchange between systems that otherwise could not communicate.

However, neither a file format, nor a protocol specification, can actually

Successful video workflow management

While the approaches above have various limitations, two more holistic approaches exist that tend to meet the full set of video workflow management requirements:

- *Software development.* A growing number of media companies are building their own process management tools. The result is usually either done well at significant cost or done cheaply in an unreliable fashion.

When fully funded, software development has several advantages over traditional methods, particularly when that software can understand video data types, and can arbitrate between partial implementations of standards, removing the burden of interoperability from individual vendors. Such efforts may even be built upon existing middleware and standards, with software developed to fill the gaps as necessary.

When done cheaply, software engineering can be precarious: An IT manager may appear to reduce costs by automating a workflow, but if the result

is a set of batch scripts on outdated computers, this can be a risky solution for companies where the video workflow is actually the revenue workflow.

• *Video workflow management solutions.* More recently, a new breed of solutions has arrived that are specifically targeted to address the challenge of video workflow management. Such video workflow management solutions tend to be at the intersection of the more traditional solutions. They include aspects of DAM such as storage management, clip management and metadata indexing. They offer integrated analysis, transcoding and multichannel distribution tools. They may also maintain the flexibility of SOAP-based generic interfaces while actually understanding video data types, with the ability to pass video information between process steps.

Some such solutions are hosted with monthly fees — allowing companies to

move their entire video workflow out of the building. This can save on capital expenditure, but not all content owners are comfortable allowing their primary assets to be managed externally.

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Some in-house solutions involve systems integration work to implement the process and tend to be a large-scale proposition. For companies looking for a consultative review of internal processes, this can be an effective approach.

Finally, some out-of-the-box video workflow management solutions now exist. These solutions can offer easy-to-use workflow design and automation — with third-party integration in mind. This allows them to be deployed organically, interacting with existing systems to manage parts of the video workflow on an opportunistic basis. These systems can scale up to full enterprise-class workflow management solutions, and can generally fit into an existing custom software architecture using Web services interfaces. As a result, these solutions may provide a low-risk, high-potential approach to introducing video workflow management within an organization, without requiring significant investment of time or capital investment. **BE**

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